COAL AGE

APRIL 1961
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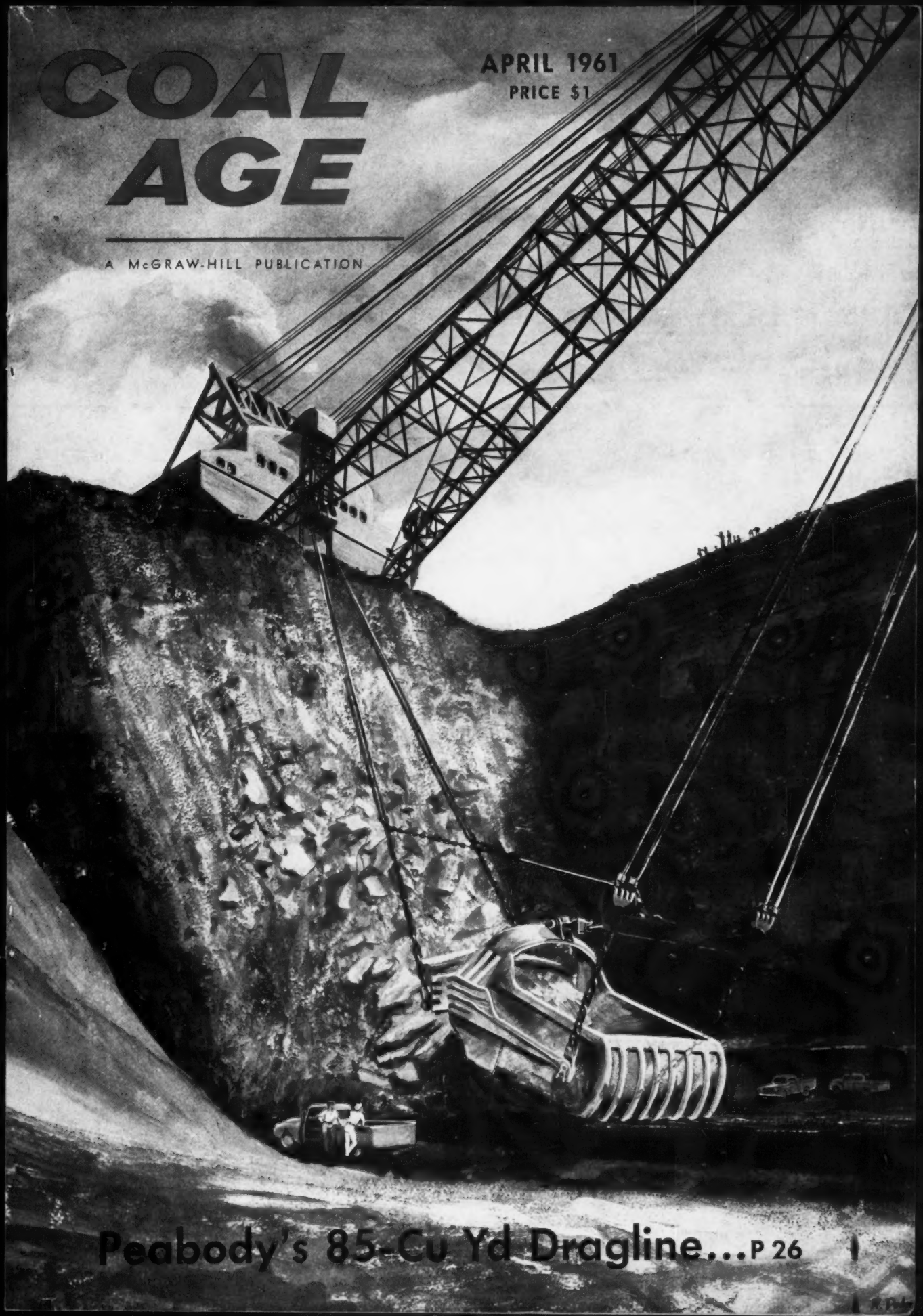

Peabody's 85-Cu Yd Dragline...P 26

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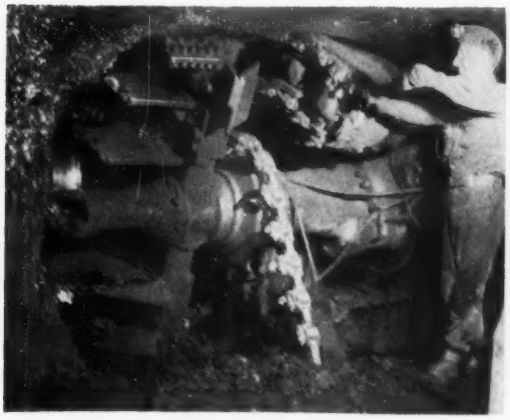
This Month in COAL AGE

April, 1961

Features:

Departments:



Mining Methods

Continuous Mining Boosts Productivity and Safety at O'Donnell No. 1 . . . . p 72

Continuous mining is paying dividends in greater productivity, increased safety, simplified ventilation and more complete coal recovery at Rochester & Pittsburgh's O'Donnell No. 1 mine, Four States, W. Va. This operation has one ripper unit and four borer-type continuous miners producing from the Pittsburgh seam. A nine-man crew advances an average of 140 to 150 ft of heading per shift, including delays from clay veins and sulphur bands. An auxiliary fan and flexible tubing provide a fast-moving current of air to the face in entry development.

Stripping Analysis

Henry Rumfelt,
International Div., Bucyrus-Erie Co.

Weight-Usefulness Relationships for Stripping Machines . . . . . p 79

Growth in size of stripping machines and increasing depth of overburden have intensified the search for procedures to economically treat with the problems of deeper stripping. Needed is a quick and reasonably accurate method of making preliminary appraisals for preliminary evaluation and orientation. The approach to the problem has as its objective a simple preliminary casting analysis for a stripping prospect. This approach employs indicated trends in the relationship of machine weight to ability to do work, which is established through MUF (maximum usefulness factor) numbers. New designs of draglines incidentally, apparently are providing more-favorable MUF numbers. In applying the principle, equations giving MUF numbers are solved for various overburden depths by means of a computer, thus permitting a preliminary conclusion as to type and size of machine.

(Continued on p 7)

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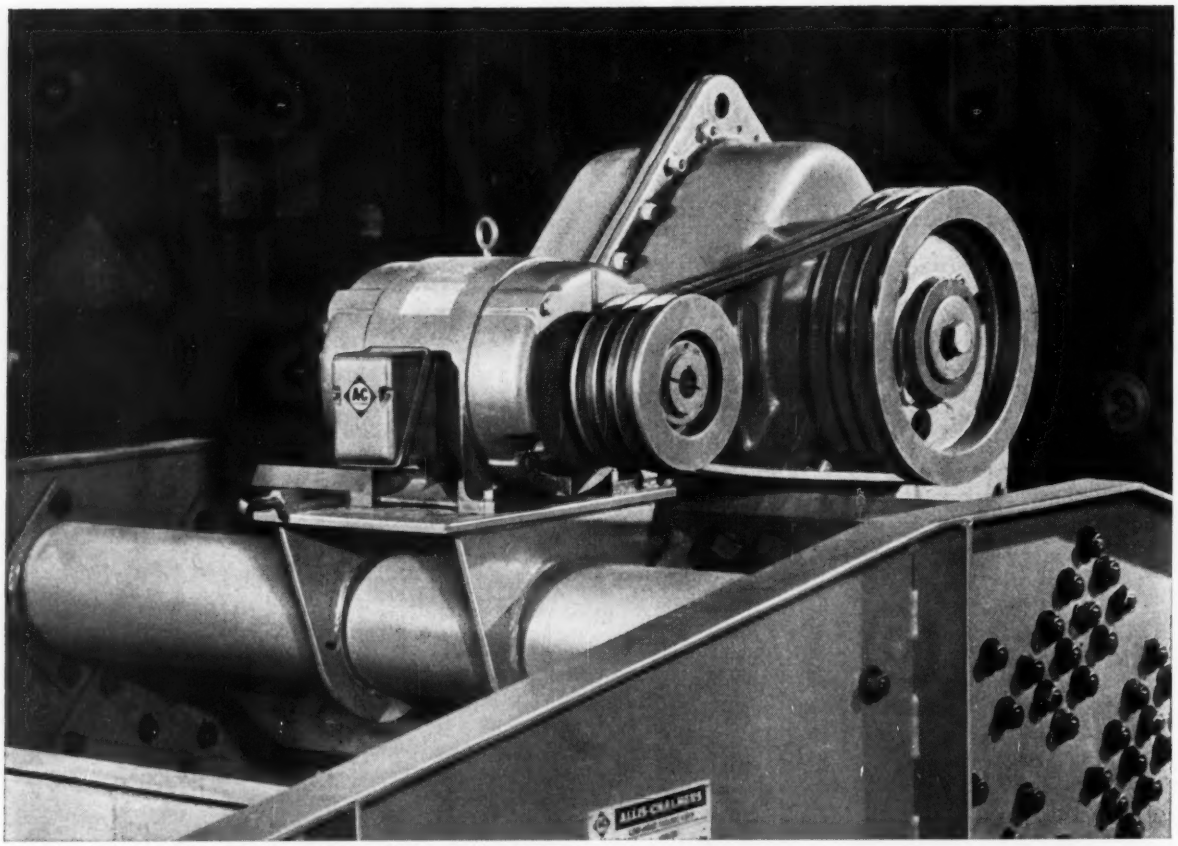

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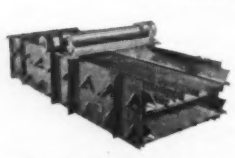
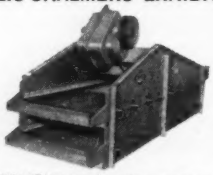
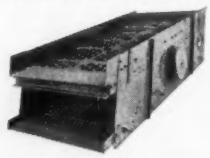


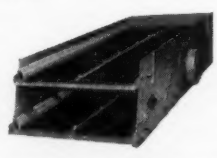
Model AVS AERO-VIBE inclined screen for economical scalping and coarse sizing.



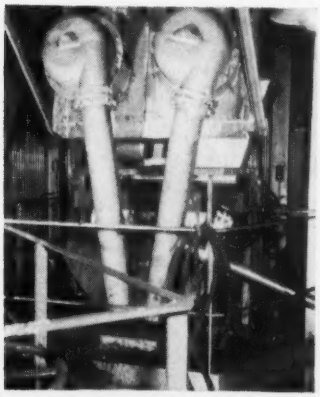
LOW-HEAD horizontal screens for efficient coarse to fine sizing (wet or dry), rinsing, thickening, dewatering, media recovery.



Model XH RIPL-FLO inclined screens for cost-saving scalping and coarse sizing.



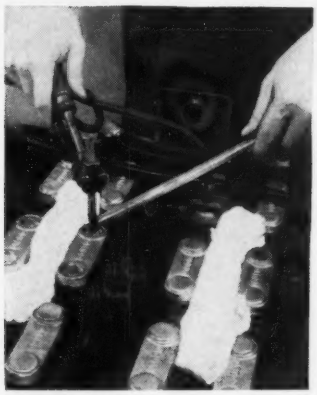
Model SH RIPL-FLO inclined screens for light scalping, coarse to fine sizing (wet or dry) and rinsing.



Preparation

Heavy-Medium Cyclones Wash Fines Precisely For Metallurgical Market ..... p 88

A heavy-medium-cyclone addition to its Bartley No. 1 plant, Bartley, W. Va. provided Island Creek Coal Co. with a prompt solution to the problem of a tightening metallurgical market and worsening mining conditions that resulted in more refuse in the raw fine coal. Today two Dutch States Mines heavy-medium cyclones with AccuRay automatic density controls yield a product that consistently averages 3.85% ash to meet the rigid standards of the metallurgical market. The cleaning efficiency of the heavy-medium cyclone, low cost of the facilities and the short time required for construction led the company to choose the heavy-medium cyclone plant.
Specials—Size consist and analysis of feed and clean coal; flow sheet



Maintenance Ideas

Care and Operation of Storage Batteries ..... p 94

Industrial-type storage batteries provide power for miniature truck-mine equipment, personnel cars, supply tractors, etc. This power source is especially popular for thin-seam mining. As the number of thin-seam mines increases, so does the number of storage batteries. Successful operation of this equipment depends, in part, on seeing to it that batteries receive the proper care and attention they require. This article, condensed from a manual entitled "Instruction and Maintenance Data," published by Gould-National Batteries Inc., covers theory, test equipment and operation of storage batteries.

(Continued on p 9)

This Month in **COAL**

STILL NO LIFT—The first quarter for bituminous was a disappointing 22% under the same period in 1960. Will the second be better? So far, there is little evidence of any significant increase in the production rate. When will the turnaround occur? Some profess to see signs of its taking place reasonably soon, and even the New Frontiersmen, who cried doom with almost complete unanimity, are now occasionally pointing to what they consider a favorable portent. Somewhat timidly, a growing number of plain citizens—economists, businessmen and others—are beginning to talk about a reversal about the middle of the year. If it comes, then bituminous can perhaps begin to recoup some of the losses of the first quarter—and those that may be registered in the second as well.

COLD SHOT—Piling up the degree days, Old Man Winter of 1960-61 has set the stage for something many thought would never occur again—a reversal, even if it proves to be only temporary, in the downward drift of anthracite. Hard coal wound up the first quarter some 2% ahead of 1960, and if normal coolness should prevail this fall and early winter, might be able to cite 1961 as a year it held its own and perhaps even bounced back a little.

INVESTMENT BULGE?—Unless the frosts of continued low production wither it, a slight boom in capital investment may be in the making in 1961. Some of the reasons adduced are recent restrictions in the spending rate, the fact that the backbone of the industry has learned that it can live and even make fairly good money at a relatively low production rate, and the need to be prepared to cash in when business picks up and demand strengthens. The incentive to improve and modernize is as big as ever. As noted, probably only continued low production can keep it from generating orders.

CHEER DEPT.—Though many recent developments can hardly be classified as anything but minuses, including the New Frontier attitude toward residual-oil imports, there are a few plusses. One positive one is the pressure that coal and the railroads are putting on natural gas, which has led at least one distributor to charge that coal is being "dumped" into natural-gas markets. His charge was prompted by substantial losses of industrial business. The process is still going on in his and contiguous territory, from which comes very recent reports of switches by both chemical plants and utilities.

NO HELP—As was prophesied in this column and elsewhere, coal is going to have to work to get much of its program accepted by the new administration, which has already shown the direction of its thinking, by coming out for greater speed in government development of nuclear power, for federal power generation, and for more-generous allotments for residual importers. And its coolness toward business is shared by much of Congress, though on the credit side of the idea of a fuels study has been endorsed. But in general it must again be concluded that coal may have trouble getting a hearing on its ideas, and perhaps even more trouble warding off actions that could hurt.

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The Coal Show

Program and Equipment Preview . p 110

Over 200 organizations providing equipment, materials and services have signified their intention to participate in the 1961 Coal Show of the American Mining Congress, Cleveland, Ohio, May 15-18. A preview of the program (p 110) shows 42 papers covering all phases of operation, plus discussion of a national fuels policy and a look at the future of coal. On the equipment side (pp 119-152) the show will feature new and improved equipment and materials from multimillion-dollar stripping units down to bolts, screws and cotter keys.

New Opportunity—See and hear about the latest and best. Plan to go to the Coal Show. Check the program and preview in this issue and plan to get the most from the time you will spend.

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THIS MONTH . . . In Mining Practice

NOT THROUGH YET—The record, if nothing else, proves the growth of continuous mining and shows that it will continue. One reason is the growing family of machines for thin coal—many of them quite different in principle from those the industry started out with for thick coal. But the conventional loading unit refuses to accept defeat—and in fact might be said to have taken a new lease on life. A large part of the credit for this latter development goes to the major capacity increases designed into the machines—and into the auxiliary equipment. As a result they can challenge the continuous miner on something more than a limited scale.

LOWER-COST CLEANUP—The need for cleaning up water is growing and will mean that more and more money will be required. Can it be done simpler and cheaper? Naturally, this is the goal of a lot of work, and it is beginning to appear that aside from its other benefits, flotation may be worthwhile almost alone from the savings it may make possible through simplification of the water-clarification circuit. Certainly this concept is attracting increased attention. And for those interested in the advantages of flotation, the variety of units to choose from increases almost daily.

DIFFERENT APPROACH—The steel arch, the yielding steel prop and other kindred forms of roof support unknown in the U. S. only a few years ago are continuing to find increasing use. Taking care of weight naturally is the main objective, but there are others. In one arch installation, for example, the arches form a canopy where the exposed rock weathers badly and tends to spall. They are widely spaced without complete backfill and the hope is that the falling material will take care of filling and prevent further weakening. Though success is anticipated, time will be required for final proof.

WHEN AND WHEN NOT—The computer family continues to grow as they find wider use in industry, including mining. More varieties are available for more jobs, both big and little. The main applications in mining are two: first, handling major record-keeping and document-producing jobs, as payrolls, checks and payroll reports, and, second, performing the calculations required in researching, as examples, a continuous mining setup or how to get the most return in mixing and blending coal sizes in preparation. When to use and when not is becoming clearer. If a situation offers only a few choices, solving may not justify computer use, or if the clerical time for an operation is low, likewise. The big savings are in manpower, storage space and so on, where many calculations or a mass of data are involved.

WHAT LIMIT?—The average depth of overburden handled in stripping keeps right on climbing—also the peak depth, now substantially over 100 ft for draglines. It will continue to increase, but the possible limit still is a question, perhaps depending on how fast deep mining comes along. Tons per man in deep mining nearly doubled between 1949 and 1959 (5.42 to 10.08), while strip tons went up less than half (15.33 to 22.65).

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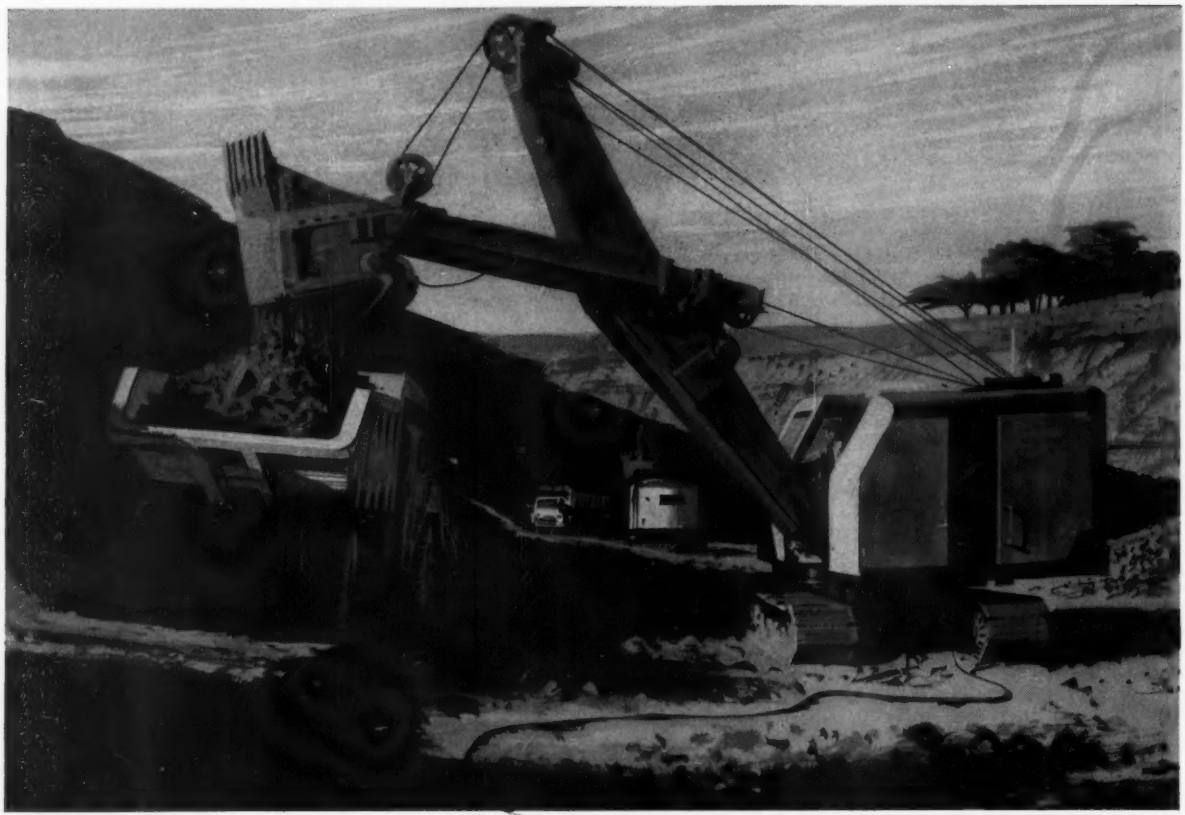

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The Coal Commentator

Continuing Process

An increase in dragline size has been expected by many people for some years, but your commentator, for one, did not expect the giant jump represented by the machine shown on the cover of this issue of *Coal Age* (see News Roundup for details). **From 35 cu yd to 85 is a real leap up in any language. It incidentally gives Peabody the lead in dragline size in addition to the shovel lead it already had captured with the 115-cu yd unit now under construction.**

Some might wonder about the economics of such outsized machines. As a matter of fact, they are as good as their predecessors—and, in the case of modern draglines, perhaps even better. This is a key point made by Henry Rumfelt in his discussion of the relationship between stripping-machine weight and usefulness in the feature section of this issue.

So . . . the size of stripping machines keeps on rising. Next step? Possibly 150 cu yd or better for a shovel and 110 cu yd for a dragline. When? Maybe not more than a couple of years or so at the most.

More Than Before

How fast the bloom has faded on the nuclear-power rose may be gaged from the fact that Great Britain, which only a few years ago was going all out for nuclear plants, has now announced a new coal-fired power plant with an eventual rating larger than any other plant anywhere in the world at the present time.

But events such as these do not dampen the public-power enthusiasts and the politicians in the U.S. The present administration rode into power partly on the promise that it would play a bigger role in power developments, including nuclear. The new Secretary of the Interior has served notice that at least his part of the administration expects to promote federal competition with the private power industry. This accompanies a greater push aimed at making nuclear power "competitive in high fuel-cost areas by 1970."

One thing thus became evident. Coal needs to watch even more than before and act with others to prevent establishment of a subsidized nuclear industry and expansion of subsidized hydro development, in addition to opposing a growing tendency of the government to compete against private business.

R-C Systems

One very logical system of using the R-C, remotely controlled, miner has of course already been worked out. It consists of establishing a bench or setting up in a final strip cut, punching in, backing out and setting over to punch in again.

As long as the R-C machines work from the outside, this probably will be the basic system. Eventually, however—perhaps in 2 to 3 yr or less—the principle will be employed underground. Then what? One idea is to shuttle the machine back and forth across a face 1,000 ft or more between permanent service entries. But there is at least one more—basing the machine in only one service entry and sending it only 200 to 300 ft, then setting over similar to the practice with the control unit outside. Among other things, chances of roof trouble and machine entrapment could be substantially reduced.

Those that might think that R-C machines will bring radically different mining schemes probably will not live to see their expectations fulfilled. Underground mining by remote control probably will employ systems not too different from those now in effect, though longwall may become more common.

Far-Out Mining

Word comes from abroad of another idea for coal breaking in the far-out or blue-yonder class, though your commentator might eventually have to eat those descriptions. But if that meant a major development in economical coal production he would gladly do so.

The idea is based on using high-frequency waves from an antenna inserted in a drill hole to convert moisture in the solid to steam and thus break out the coal. It goes into the group of other ideas employing wave energy, including sonic coal breaking, or using sound waves; the establishment of resonant conditions in the coal bed, causing it to disintegrate; and so on.

No one can say when one of these ideas, or some other yet undreamed of, will do the trick. But for quite awhile yet the energy for breaking probably will be applied through a pick or bit, or through the detonation of explosives.

Belt Mileage

Though the battle between the plied and the solid-carcass conveyor belt still goes on, it is becoming apparent that there is a place for both, depending on conditions and service. So the ply type cannot be ruled out yet, nor should existing footage be discarded without a careful check to make sure that real value is not being jettisoned at the same time. Belting represents a heavy investment, and proper repair and reconditioning provide the maximum return.

The job can be done by the coal company or by the excellent independent service shops in the coal fields. And whatever the type, there is a right way and a wrong way of using and caring for it. The difference in mine cost is substantial.

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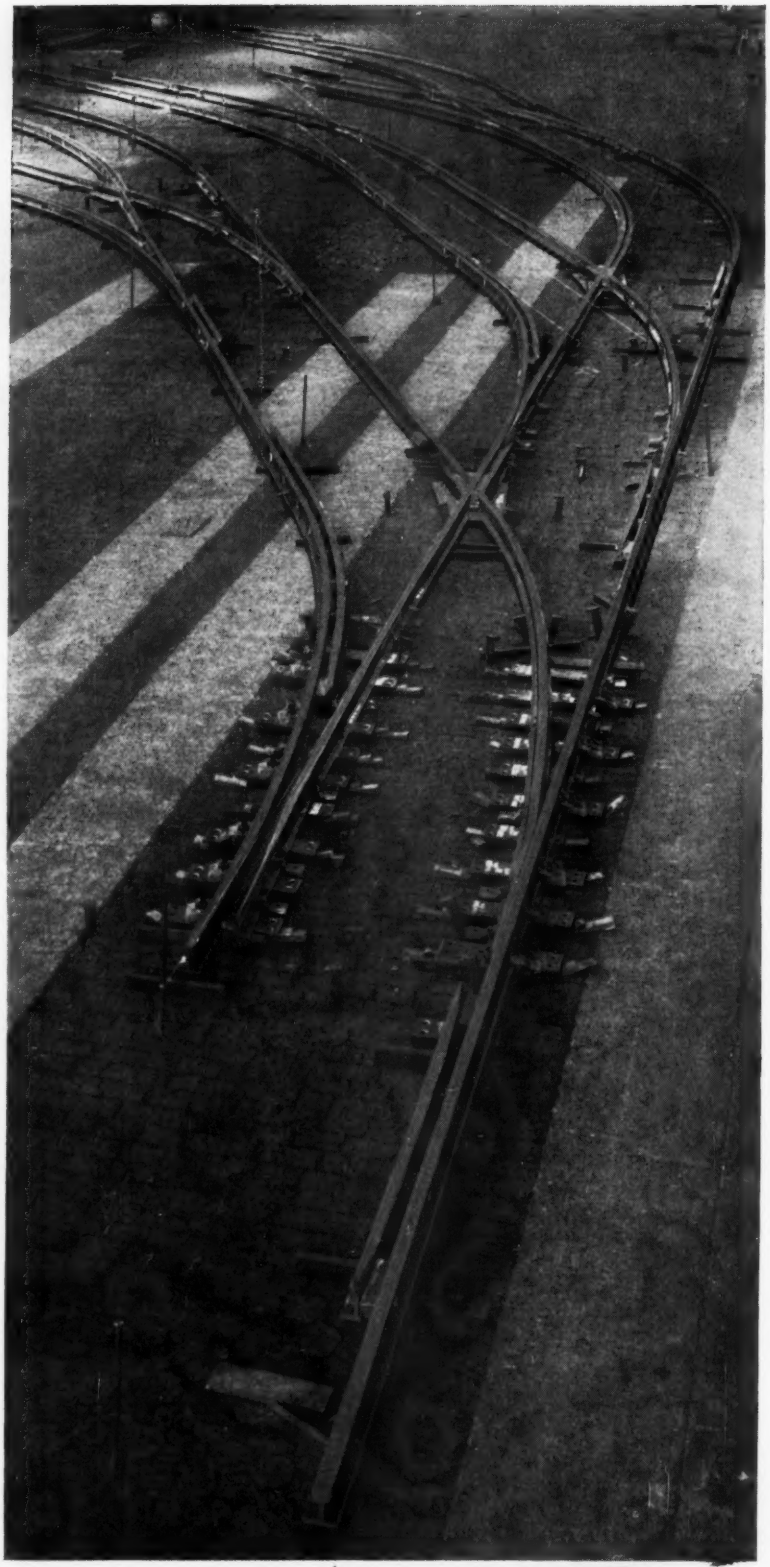

A yard ladder-track is a pretty sizable piece of trackwork to put together indoors. Yet here is a compound ladder-track on one of the layout floors at our Steelton, Pa., plant, and there's plenty of room to spare!

Special trackwork of all kinds is a Bethlehem specialty. If you need special track, whether it be heat-treated stock rails or double-slip switches, you can bring the problem to Bethlehem trackwork specialists . . . and leave it with them.

Their first move will be to draw up plans for your approval. Next, they'll fabricate the various components and completely assemble them in our plant. When everything fits, when bolt holes, gage, and alignment check, they'll matchmark the pieces to correspond with similar markings on the plan, then ship the material to your job site.

This Bethlehem technique will save you money through elimination of field-cutting, curving, and drilling of rails. Cuts out scrap loss too. A Bethlehem engineer will be glad to discuss details and answer your questions. Get in touch with him through the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

BE SURE TO VISIT US AT THE
COAL SHOW
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BETHLEHEM STEEL

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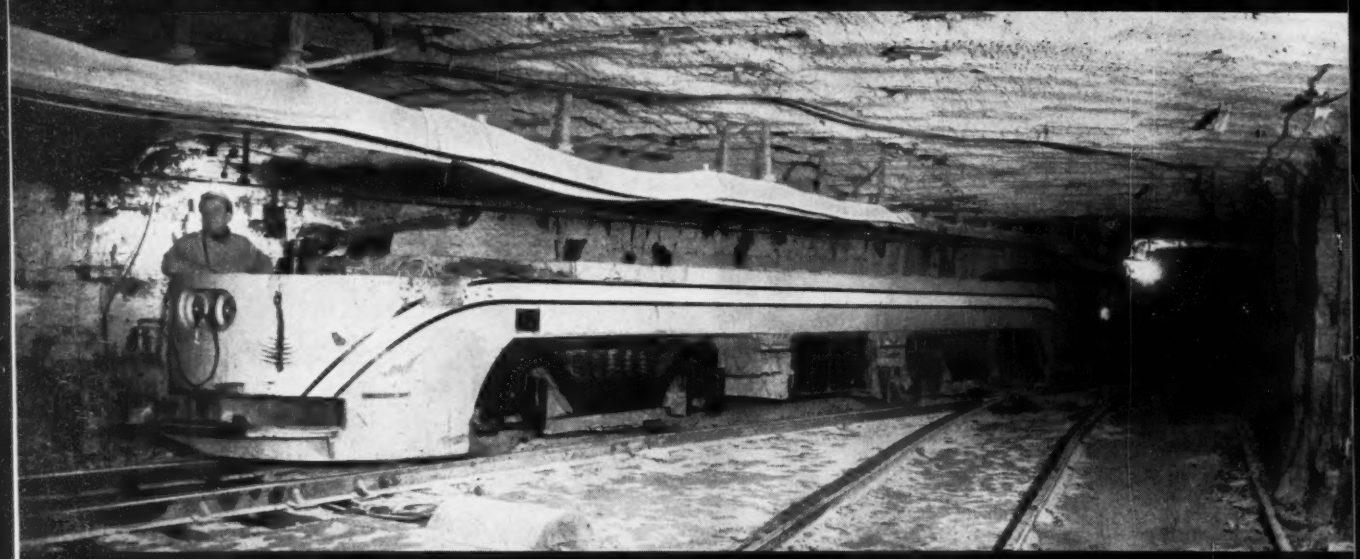
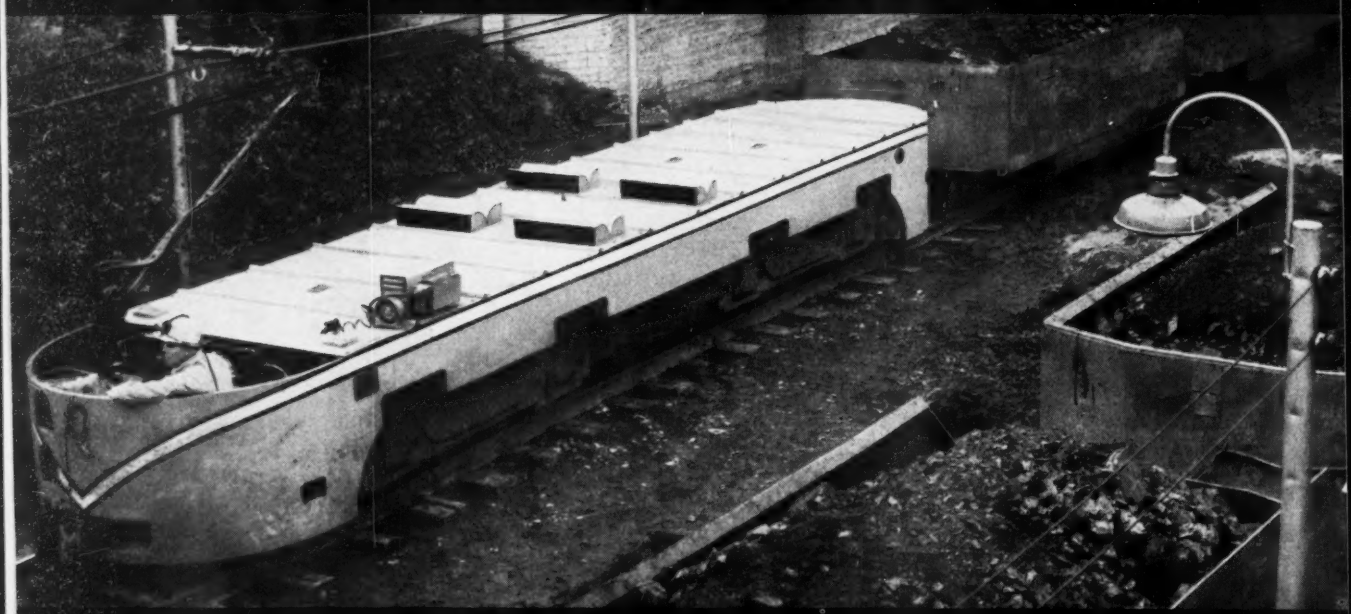
GENERAL ELECTRIC'S MINE LOCOMOTIVES



COMBINE ADDITIONAL SPEED AND POWER



TO INCREASE OUTPUT AND REDUCE COSTS

Below ground and above, General Electric 4-axle, swivel-truck mine locomotives build profits by hauling heavy loads at increased speeds.

The combined improvements in power, weight and speed reduce traffic congestion, simplify dispatching and boost tonnage per shift, thus reducing operating costs. Resulting performance matches the pace set by new highly productive face equipment.

Maintenance costs are lowered through latest design advances including high-rated motors, reliable control, rugged mechanical equipment and easy accessibility to all components. Even track maintenance is reduced by the smooth-riding short wheel base swivel trucks.

For more information on how to increase output and reduce costs with modern motive power, call the nearest General Electric Sales Office or write General Electric Company, Erie, Pennsylvania.

116-01

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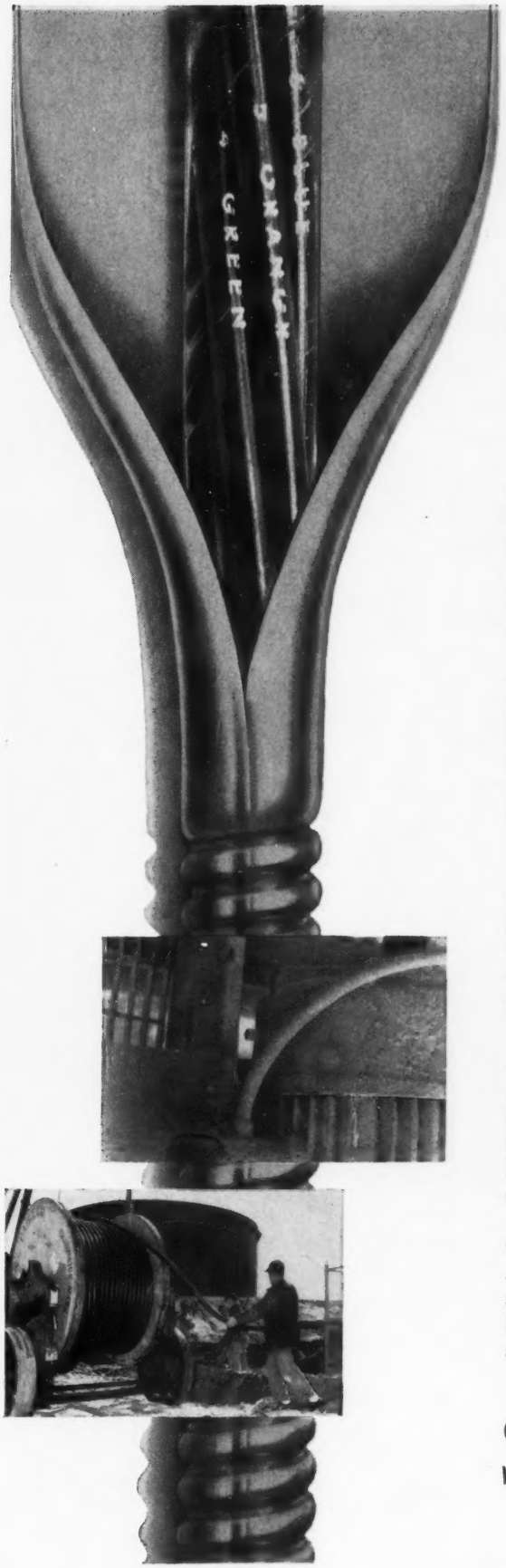
GENERAL ELECTRIC



Only C-L-X®
Continuous Lightweight eXterior

Sealed Cable Systems by Simplex Can do so Many Jobs so Well

Simplex C-L-X is a packaged combination of cable and an extremely pliable, corrugated metal sheath. It requires no separate duct or conduit regardless of environment. It is available with steel sheath and plastic jacketing; and with copper or aluminum sheaths, with or without plastic jacketing.

C-L-X Cuts Installation Costs

By using a single length of 3-conductor 15KV C-L-X for both underground and aerial use, a Southeastern utility company saved more than 20,000 dollars from what it would have cost for a complete underground duct system.

Resists Chemical Attack

Conduit life in this company's calcium chloride reclamation building was only 6 to 9 months. The conduit was replaced with a C-L-X cable system which — after two years of operation, shows no signs of deterioration.

Protects Against Liquids and Gases

An East Coast petroleum tank farm used a C-L-X 8-conductor cable protected with PVC for direct burial in ground that was saturated with oil, gas and water. Result: Perfect performance at a sizeable savings over conduit systems.

Only Simplex C-L-X offers you: Exceptional Strength . . . Unequalled Pliability . . . Protection from Liquids and Gases . . . Faster Installation and Lower Costs. Send for Illustrated Brochure containing Application and Engineering Data.

SIMPLEX WIRE & CABLE Co

CAMBRIDGE, MASSACHUSETTS

fit a "HENDRIX" Heavy Duty Mining Bucket

into any stripping picture

- LESS DOWN-TIME
- MORE PRODUCTION
- LESS MAINTENANCE
- LOWER COST-PER-TON

4½ to 40 Cubic Yards With or Without Perforations

Hendrix HD Dragline Buckets

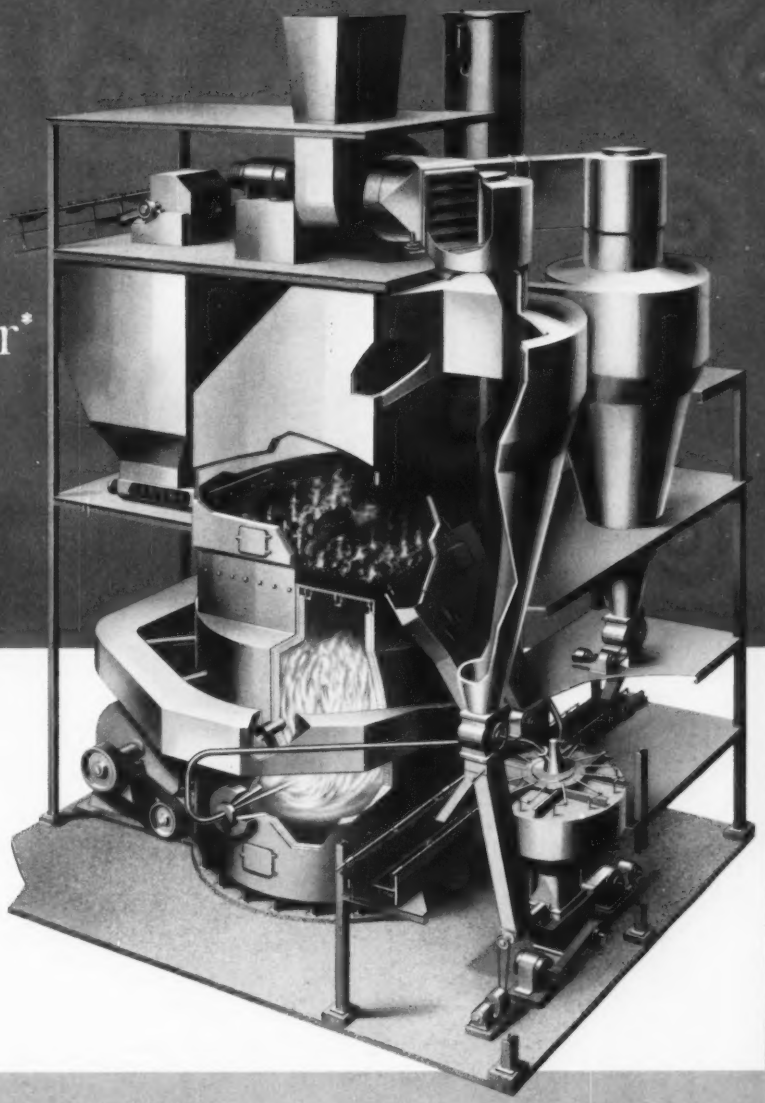
HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA

Visit Our Booth #717 at the COAL SHOW—CLEVELAND—May 15-18

NEW—

McNally Flowdryer* ...an improved fluid-type fine coal dryer



- BLOWER HP REDUCED 50%
- LESS PICKUP OF FINES
- GRATE OPENING ADJUSTABLE BY SECTIONS
- AUTOMATIC CONTROL OF FUEL FIRING AND TEMPERING

Here is a fine coal dryer—the result of over 20 years of experience in the field—which incorporates the best features of all McNally Pittsburg designed dryers.

The McNally Flowdryer is designed in various sizes to handle an output of from 25 to 500 tph of coal, or from 3 to 36 tph of evaporation per single unit. It will handle a size range varying from 1-1¼ x 0 to 10 mesh x 0, depending upon the material to be dried.

Two fans—a suction fan over the grate and a tempering air fan under the grate—provide a high evaporating capacity with very low motor horsepower. In addition, the pressures are neutralized in the coal bed so that there is a minimum pickup of fine coal.

*Patent Pending.

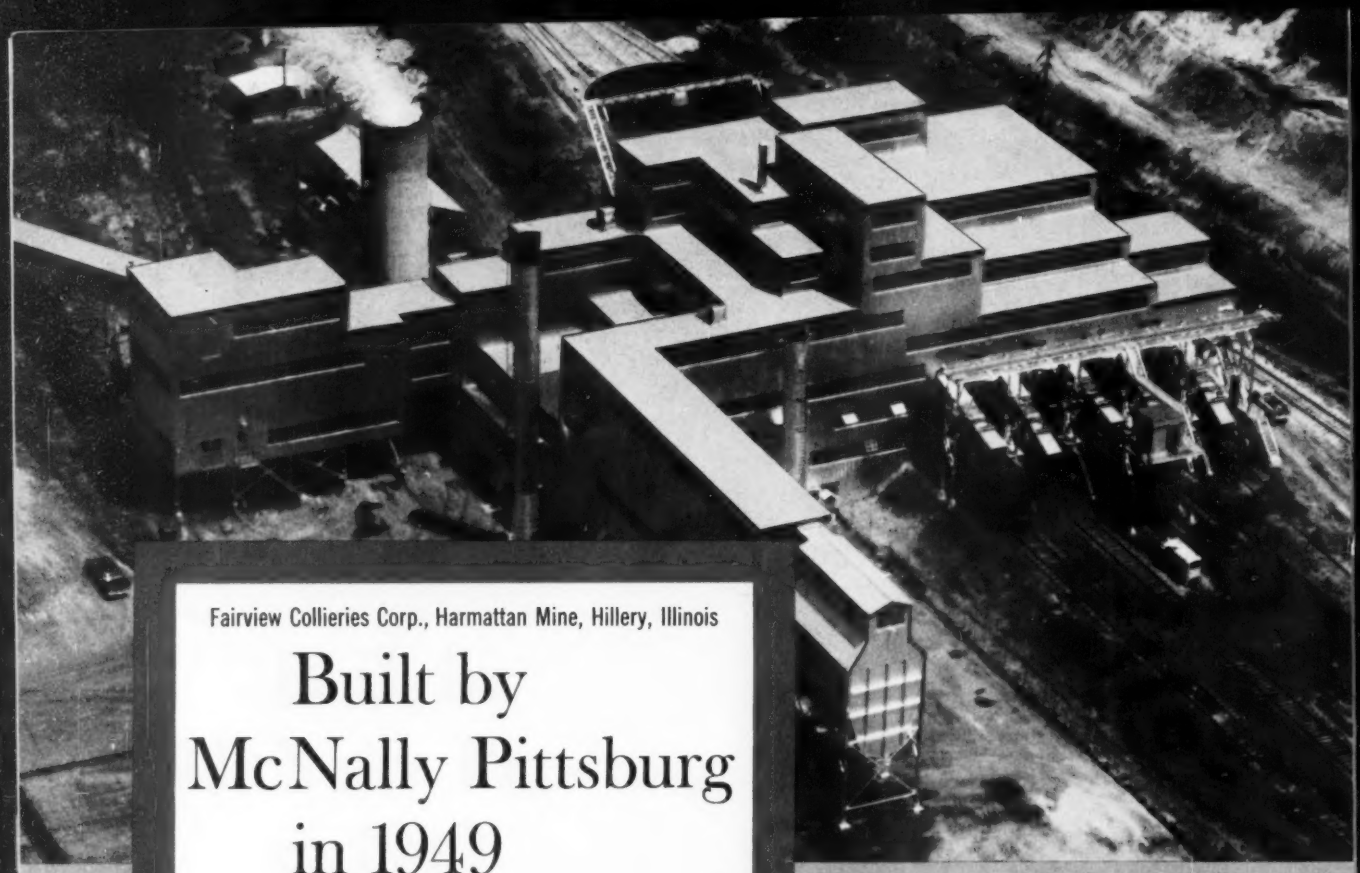
One of the outstanding features of the McNally Flowdryer is the adjustable grate. The upper plate is sectionalized, and screw adjustments make it possible to vary the openings at each section of the grate independently. This permits maximum drying efficiency and eliminates fuel waste.

The pulverized fuel firing system and the tempering air are automatically controlled to maintain a constant temperature below the coal bed and to deliver the exact volume of drying gases needed. Automatic controls are also provided for the exhaust system. WRITE FOR NEW CATALOG describing the improved McNally Flowdryer. McNally Pittsburg Manufacturing Corporation, Pittsburg, Kansas.

ASK THE MEN WHO KNOW COAL FROM THE GROUND UP

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL



Fairview Collieries Corp., Harmattan Mine, Hillery, Illinois

Built by McNally Pittsburg in 1949

...Competes successfully today without modification!

When it was built, this Fairview Collieries installation was the last word in modern design. Today, it is still one of the most modern, complete washing and thermal drying plants in Illinois. Through the sound marketing and management strategy of Fairview Collieries—and the "years-ahead" McNally Pittsburg design of its preparation plant—it has been competing successfully in a high tonnage market since 1949 *without a plant modification of any kind.* The plant has produced over 750,000 tons of uniform, high-quality coal. Here is proof that the McNally theme—*"The future belongs to those who prepare"*—really pays off.

The "Man from McNally" offers you an outstanding engineering background, plus the "know-how" that makes possible the advanced design in McNally Pittsburg plants all over the world.

Fill out the coupon for complete details on McNally Pittsburg coal preparation equipment.

MAIL THIS COUPON

McNally Pittsburg Mfg. Corp., Pittsburg, Kansas

Gentlemen:

Please send me information about the following equipment:

- ☐ Complete Coal Preparation Plants
- ☐ Automatic Sampling
- ☐ Crushers and Breakers
- ☐ Coal Preparation Manual
- ☐ Thermal Dryers
- ☐ Coal Cleaning
- ☐ McNally Flowdryer
- ☐ Conveyors
- ☐ Centrifugal Dryers

NAME_____ TITLE_____

COMPANY_____

CITY_____ STATE_____

C

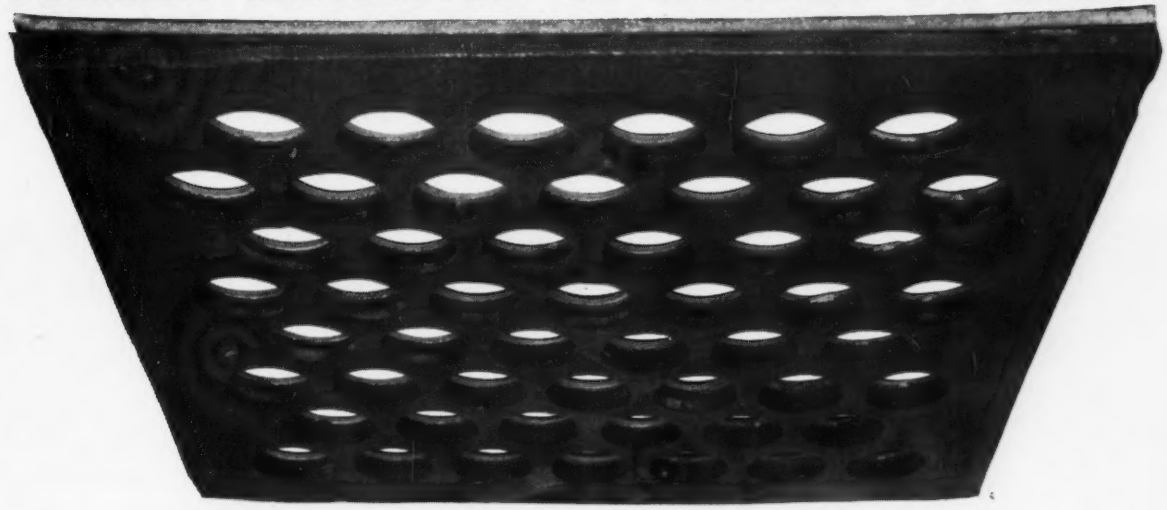
McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

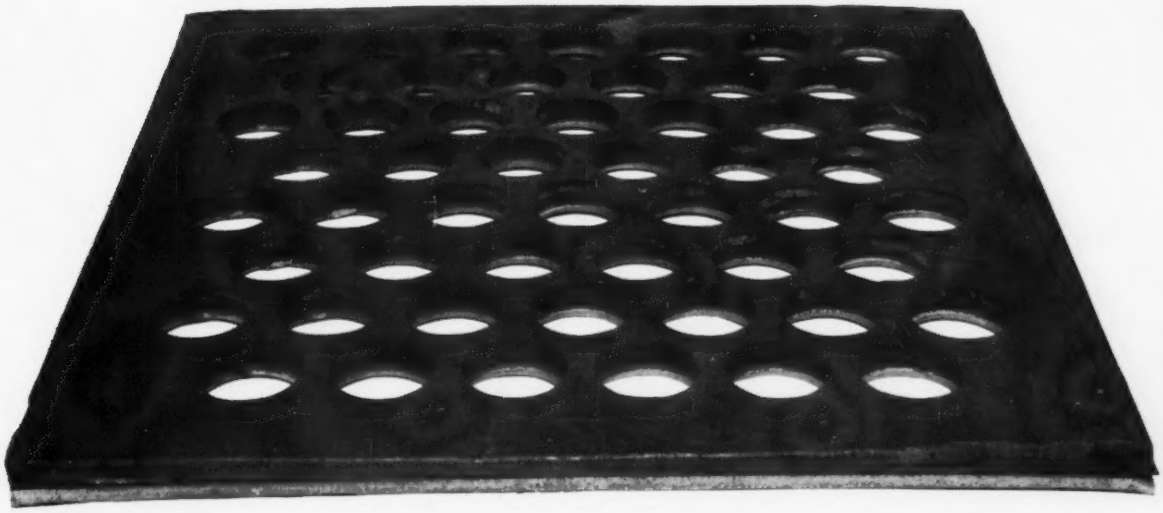
McNally Pittsburg Manufacturing Corporation
Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio
Engineering and Sales Offices: Chicago • Rio de Janeiro
Pittsburg, Kansas • Wellston, Ohio

Printed in U.S.A.

SCREEN SANDWICH OF RUBBER ON STEEL



TAKES THE BITE OUT OF ABRASION COSTS



A specially designed rubber covering protects Hendrick Perforated Metal Screens by absorbing the abrasive action of ore, coal and stone. As a result Hendrick rubber-clad metal resists plate wear under extreme screening conditions. Rubber lasts longer because it is vulcanized under controlled heat and laminated to the steel by a new adhesive.

For more information about this unusual product, we invite you to contact your local Hendrick representative (he's listed in your Classified Telephone Directory under METALS, PERFORATED) or mail in the coupon.

HENDRICK Manufacturing Co.
Carbondale, Penna.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens
Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids • Hendrick Hydro Dehazers

HENDRICK Manufacturing Company
Dundaff Street • Carbondale, Pennsylvania

Gentlemen: I want more information on Hendrick "Rubber-Steel" Screens.

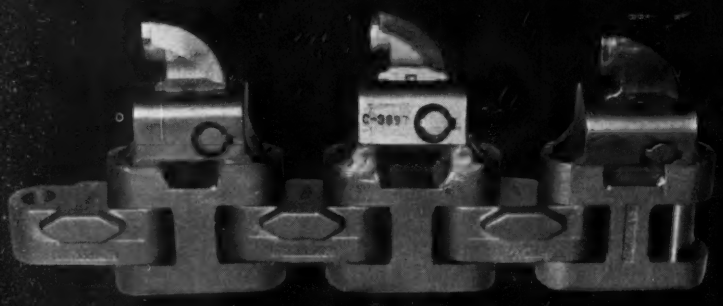
☐ Please have representative call.
☐ Please send FREE literature.

Name_____
Title_____
Company_____
Street_____
City_____ State_____

Setting New Production Records with

CINCINNATI RAP-LOK EQUIPMENT

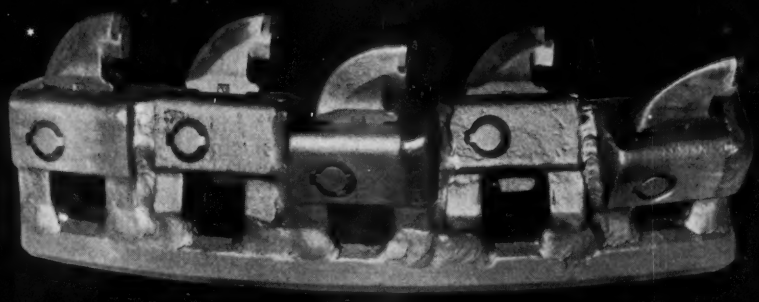
ON BORING TYPE MINERS



RAP-LOK TRIMMER CHAIN FOR BORING MACHINES

Designed to utilize the full potential of your high productive mining machines. The RAP-LOK feature producing the faster and more effective setting of bits combined with the time-tested CINCINNATI CHAIN utilizes the full potential of your machine.

* Patented



RAP-LOK BITS AND BIT HOLDERS FOR BORING ARMS

This combination is made to fit all types of Boring Machines and designed to meet specific mining conditions encountered in your mines.

The use of the CINCINNATI TRIMMER CHAIN in combination with the CINCINNATI ARMS as described above provides the highest degree of efficiency in CONTINUOUS BORING OPERATIONS. While the Trimmer Chains and Arms can be used independently, the maximum in efficiency is realized through this NEW advanced combination. CINCINNATI RAP-LOK EQUIPMENT is fast acquiring the fine reputation of all CINCINNATI products.

Bits are set and removed more rapidly with the RAP-LOK bit setting tool.

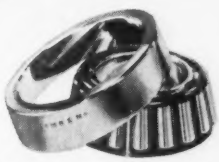
THE CINCINNATI MINE MACHINERY CO. Cincinnati 25, Ohio

HOW TO MAKE A LOW CAR HIGH IN CAPACITY

To give customers greater load capacity in a shuttle car only 27″ high was one of the problems Joy engineers faced in designing this Model 18SC3 car. They solved it with a unique six-wheeled design using Timken® tapered roller bearings on all wheels. This feature helps maintain all six wheels in contact on uneven ground and enables the car to ride smoother. The design permits 4½-ton capacity and a conveyor 56″ wide, 27 feet long.

Timken bearings are also used on the worm shafts, hydraulic motor and pump shafts, steering axle kingpin and cable reel drive. Their tapered design lets Timken bearings take *both* radial and thrust loads. Their adjustability permits uniform, accurate running clearance, maintains gear alignment and concentricity of seals. Assembly is simplified because the separable components of Timken bearings permit independent assembly of cone on shaft, cup in housing. And the huge range of Timken bearing types and sizes permitted Joy to select exactly the right bearing for each application.

ON-THE-SPOT ENGINEERING SERVICE from our graduate engineer salesmen means a direct saving to you. Right at the design stage they can help you select the most economical bearing for the engineering requirement. They can help you fast on designing the mounting, too.



Industry rolls on

TIMKEN®

tapered roller bearings

The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.

Visit Us at the AMC Coal Show, Cleveland Public Auditorium, May 15-18, Booth 900.

HERE IS THE JEFFREY 100-L MINER

SEE IT AT THE COAL SHOW

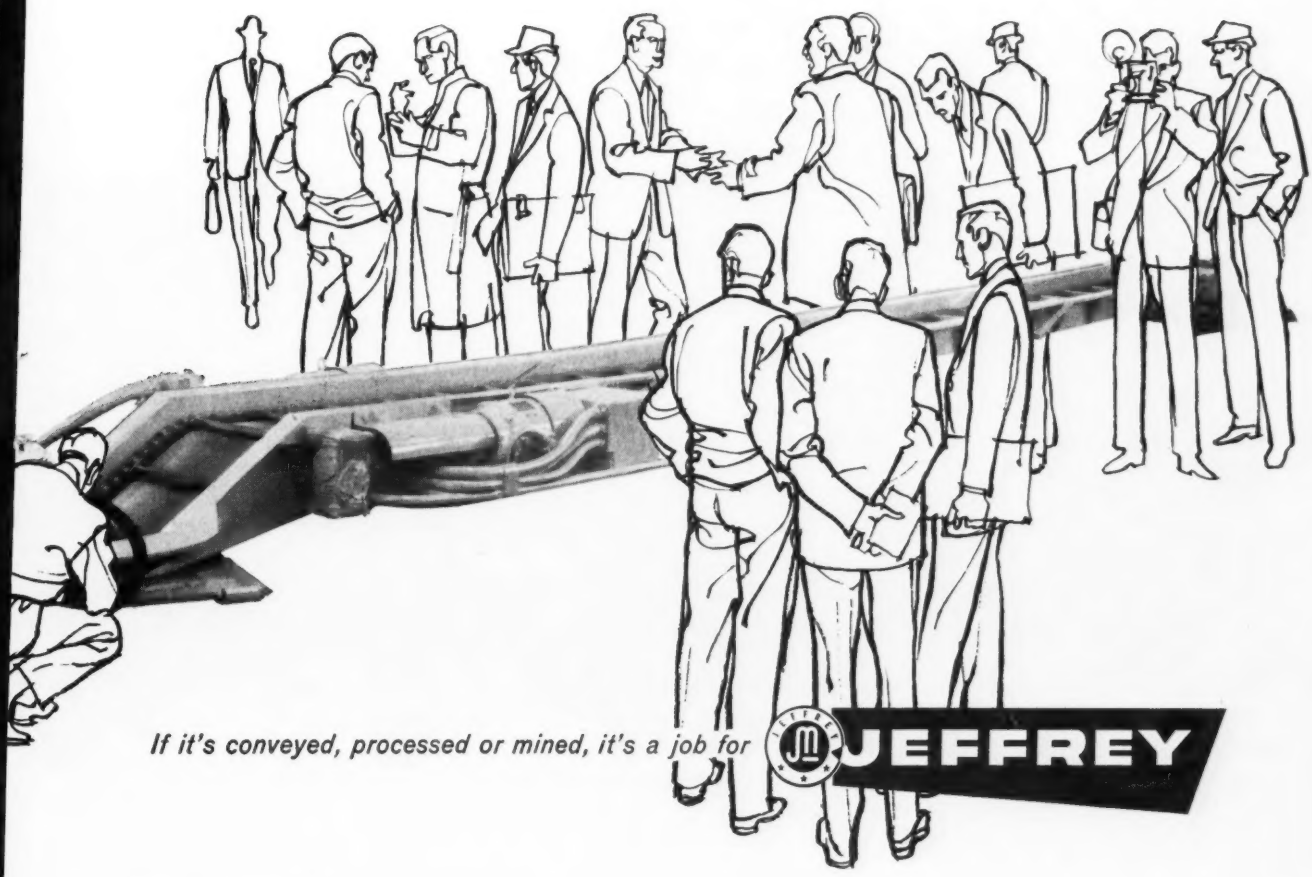
LEARN HOW Jeffrey's quality now comes in a continuous miner only 20½" high.

LEARN HOW maximum production can be obtained in a new, low-cost way.

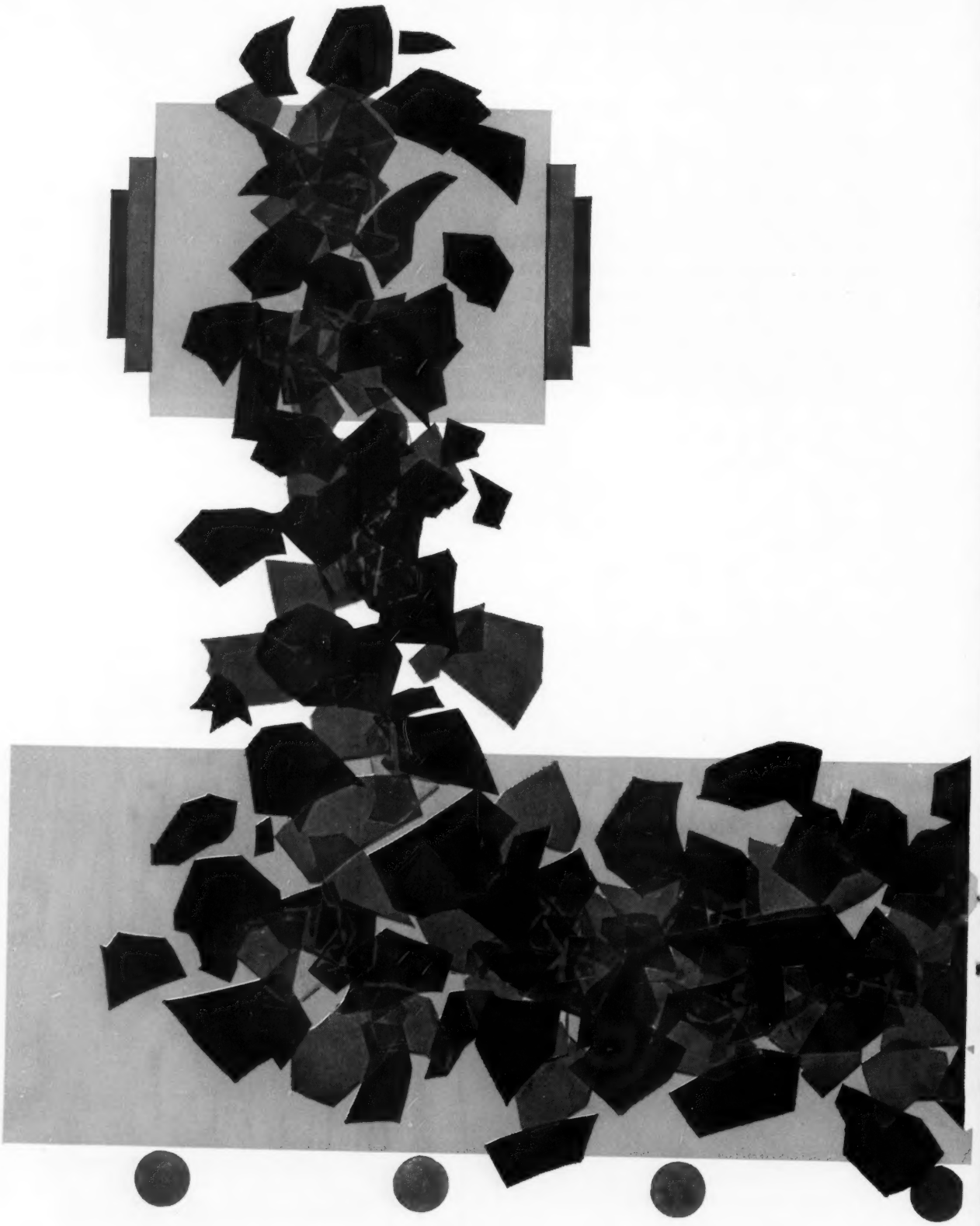
LEARN HOW Jeffrey's new Model 100-L Miner works with a Jeffrey 94-L Bridge Conveyor with only a four-man crew.

LEARN HOW operating costs have been slashed by this new design.

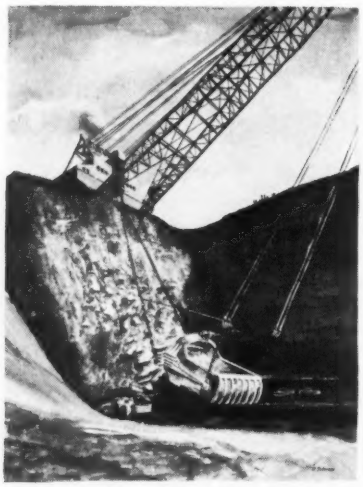
SEE IT AT THE SHOW. JEFFREY'S NEW MINER WILL BE IN OPERATION THERE. COMPLETE INFORMATION AVAILABLE AT BOOTH 2855, or write The Jeffrey Manufacturing Company, 912 North Fourth Street, Columbus 16, Ohio.



If it's conveyed, processed or mined, it's a job for JEFFREY



News Roundup



85-Cu Yd Dragline On Order For Peabody Coal

To set new pace in stripping . . .

ANOTHER stripping "monster" is emerging in the form of an 85-cu yd dragline now being built by Marion Power Shovel Co. for Peabody Coal Co. Over twice as large, this giant will dwarf by 50 cu yd its 35-cu yd predecessor.

Having an 85-cu yd bucket and a lifting capacity of over 221 tons, this machine will be able to drop its load on top of a 14-story building, 496 ft from digging point, its maker reports, as well as dig material 10 stories below its own standing level. With a "walking" step 7 ft 8 in long, this Type 8800 dragline will have a total horsepower of 19,750. Total length of boom above ground will be equal to 16 stories and gantry will be 100 ft above ground. To weigh in at 10,675,000 lb, the new champion will set on a circular base 80 ft in diameter. A Ward Leonard individual exciter control is incorporated in the unit.

Peabody reports assembling of the machine will take place in the latter part of 1962. No plans have as yet been formulated for naming the machine, and it has not yet been assigned to a specific property.

Other specifications of the new dragline:

Boom length, ft	275
Bucket size—Rated, cu yd	85
Actual, cu ft	2,550
Boom angle, approximate deg	37½
Dumping radius, ft	248
Dumping height, ft	143
Digging depth, std ropes, ft	108½
Maximum allowable load, lb	443,000
Hoist ropes, four, diameter each, in	3⅛
Hoist speed, fpm	620
Drag ropes, four, diameter each, in	3⅛
Drag pull, lb	800,000
Drag speed @ 75% of max pull, fpm	290
Base, outside diameter (nominal), ft	80
Walking traction	
Width, each shoe, ft	15
Length, each shoe, ft	70
Bearing area, both shoes, sq ft	2,020
Width over both shoes, ft	113
Walking speed, mph	0.15
AC driving motors, total hp	9,000
Hoist motors; eight, each 500 hp, with blower, total hp	4,000
Drag motors; six, each 500 hp, with blower, total hp	3,000
Propel motors; four, each 375 hp, with blower, total hp	1,500
Swing motors; six, each 375 hp, with blower, total hp	2,250
Swing speed, rpm	1.6
Boom hoist motors; two, each hp	40
Domestic shipping weight, less ballast, incl bucket, lb	9,775,000
Ballast, approx weight, lb	900,000
Working weight, incl ballast and bucket, lb	10,675,000

Dumping height of the dragline bucket is 43 ft 10 in and carrying clearance is 32 ftfl Empty, the bucket weighs 188,000 lb and loaded, 443,000 lb.

Always a forward-moving company, Peabody has taken great strides since its merger with Sinclair Coal Co. in July of 1955, making it the second largest commercial coal producer in the U.S. In April, 1956, as part of its $38 million coal development program in southern Illinois, Peabody was first to order a stripping shovel with a 70-cu yd bucket—largest at that time—from Marion Power Shovel Co. Just last year, as reported in the April issue of *Coal Age*, p 28, a 115-cu yd 3850 Bucyrus-Erie shovel was ordered by Peabody for a western Kentucky strip mine, and now a duplicate of this machine has been purchased.

These are just a few of the highlights marking Peabody's career in coal.

Utilization

Montana-Dakota Utilities Co., has announced installation of new generating, boiler and auxiliary facilities which will nearly quadruple the capacity of MDU's R. M. Heskett steam-electric generating station at Mandan, N. D., beginning last month.

The largest spreader stoker for lignite coal ever installed in a single furnace boiler will be a feature of the new plant. North Dakota lignite will be burned in the furnace at the rate of 71 tph at full capability. When operated simultaneously at full load, the station's two boilers will consume 96 tph.

A 580,000-kw, $73 million steam-electric generating unit will be added to Indiana & Michigan Electric Co.'s Tanners Creek Plant at Lawrenceburg, Ind. It is expected the unit will burn about 1,600,000 tons of coal annually, all of

(*Continued on p 40*)

In This Section

NOW! Westfalia Coal Planer For Thick Or Thin Seams, Full Roof Control . . . True Continuous Mining!

The Latest Installation in West Virginia Is Operating Successfully After More Than Six Months' Continuous Production

The Westfalia Coal Planer, the only *truly* continuous miner, with new Westfalia self-advancing, hydraulic roof supports and the ability to operate in thick or thin seams, will cut costs while increasing production. The Westfalia system is fully adaptable to room and pillar mines.

You reduce costs because the durable Westfalia Coal Planer lowers maintenance and repair expenses, requires no other roof supports or bolting and is operated by a minimum crew. You eliminate cutting, drilling, explosives and all other loading equipment.

Production goes up because you extract all the coal across a working face which may extend up to 800 feet or more. Production is continuous since the Westfalia planer, conveyor and self-advancing roof supports press continually against the face. Burnt or sticking top coal is removed by the planer automatically.

The Westfalia System, first brought to this country through the cooperation of the U.S. Bureau of Mines and a coal producing company, has proved itself in several hundred installations in all important coal mining areas of the world.

Use coupon below, clipped to your letterhead, for further information. Consultation on engineering or equipment problems is readily available from our technical personnel at no obligation.

Visit our exhibit at the AMC Coal Show
Booths 125, 129, 133 and 137

Mining Progress, Inc.

Sole Distributors for Westfalia Lünen

HIGHLAND MILLS, N.Y.

Mining Progress, Inc.
Highland Mills, N.Y.

I'd like to know more about the Westfalia System, the coal planer, conveyor and new hydraulic roof supports and how it can reduce costs while increasing production in thick or thin seams.

Name_____

Title_____

Company_____

Address_____

Washington Looks at Fuels

- Import allocations for residual fuel oil upped for first quarter . . . general level to be increased for 1 yr beginning in April
- Senate and House each push to conduct own national fuels study
- Other legislation of interest to coal

Oil Imports, Hot Issue

COAL AND OIL were given an opportunity to air their conflicting viewpoints on import allocations for heavy fuel oil at a hearing held the latter part of February by Secretary of the Interior Stewart L. Udall. The hearing was brought about as a result of an order by the Department of the Interior to increase import allocations for residual fuel oil by 100,000 barrels a day for the first quarter of '61.

INDUSTRY SPOKESMEN participating at the February hearing held by Secretary of Interior Stewart L. Udall were Joseph E. Moody (left), president, National Coal Policy Conference, Inc.; Stephen F. Dunn, president, National Coal Association; and Michael F. Widman Jr., assistant to the President, United Mine Workers of America.

Congressmen from the coal-mining sections stressed the depressed economic conditions of their areas and blamed them partly on the fact that imported residual fuel oil had taken away some of coal's markets, particularly on the East Coast. Stephen F. Dunn, NCA president, told Secretary Udall that residual oil imports are the "principal factor" in the American coal industry's inability to maintain production levels conforming to mobilization base requirements. He stated that current world oil surplus is posing a threat to the defense of the free nations.

L. J. O'Connor, oil imports administrator, said the oil import control program aims to assure adequate supplies of petroleum where required at fair prices to consumers and fair profits to producers. It is not, he noted, intended to regulate inter-play between coal and residual fuel oil though it does assist coal to a degree. Mr. O'Connor implied that residual import controls may be temporary when he stated that disadvantages of the program "become intolerable, if we assume controls of residual fuel oil are to be of a more permanent nature."

On March 9 Secretary Udall announced sharply-revised regulations for import allocations of heavy fuel oil, boosting the general level of imports to 461,427 barrels a day for the 12-mo period beginning April 1, 1961—an increase of 44,000 barrels daily over the comparable 1960-61 period. The regulations also place allocations on an annual basis and make Bureau of Mines estimates the criteria for supply and demand figures and open up licenses to many new importing companies. This action fed more "fuel" to coal interests on an already hot issue.

Study Need for National Fuels Policy

A resolution to create a special 15-member House committee to conduct a national fuels study was approved by the House Rules Committee the week of Feb. 20. The Rules Committee voted to report the legislation (H. Res. 183) favorably, 9 votes to 5, after its sponsor, Rep. Wayne N. Aspinall (D-Colo.) offered it as a substitute for his earlier measure which would have established a joint Senate-House committee to conduct the study. Except for keeping the study in the House and requiring a final report and recommendations prior to the close of the present Congress in 1962, the language of the resolution is similar to that of the previous Aspinall resolution. The resolution directs the special committee to study and hold hearings on the current and prospective fuel and energy resources of the nation and their present and probable future rates of consumption, government policies and laws affecting fuels and energy industries and the changes recommended to provide an effective national fuels policy.

A week later Sen Jennings Randolph (D-W. Va.) introduced legislation to set up a special 9-member Senate committee to conduct a national fuels study. The new Randolph resolution (S. Res. 105) closely parallels the House resolution but also calls for the committee to give attention to consumer interests.

Other Legislation of Interest to Coal

(1) By a vote of 392-30, the House passed a bill extending the eligibility period for unemployment compensation, with the payments financed by increased taxes on employers;

(2) The Douglas bill for aid to underdeveloped areas has been approved by a Senate banking subcommittee with some amendments;

(3) House Labor Committee voted to raise minimum wage to $1.15 immediately and to $1.25 a year later;

(4) Legislation to extend the Federal mine safety law to small mines is still under study in a House subcommittee.

At press time—President signed bill extending unemployment benefits up to 13 wk for workers exhausting regular benefits between June 30, 1960-Mar. 31, 1961 to tune of $927 million to be paid for by temporary 2-yr increase of 0.4% in employers' federal unemployment compensation insurance tax . . . House opens debate on $394 million depressed area bill.

This KW-Dart 60 SBDT is over 100 times the size of this photograph.

FROM BLUEPRINT TO PAYLOAD...

. . . KW-DART engineers planned the KW-DART 60 SBDT with your operation in mind, and it is tailor-made to provide maximum performance . . . minimum maintenance . . . maximum payload. It is designed to *reduce* your hauling costs . . . it's *rugged* and *right* for the job.

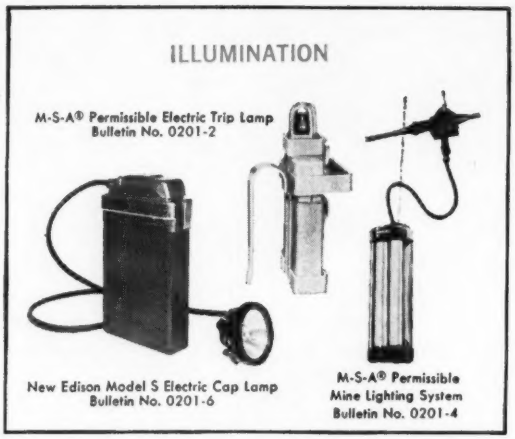
The engineering "firsts" of KW-DART Trucks range from full-time hydraulic power steering to triple reduction planetary drive axles. For detailed information, write . . .

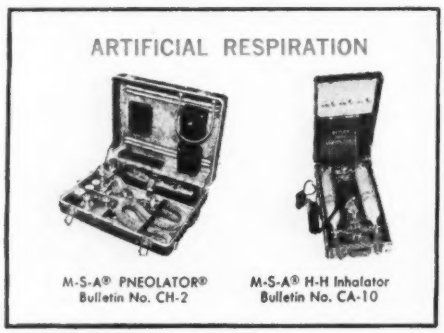
KW-DART TRUCK CO.

1301 North Manchester Trafficway, Kansas City 41, Missouri, U. S. A.

See us at the Cleveland Coal Show—Booth 1720

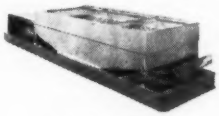
See Us at the Coal Show
Booth 1009



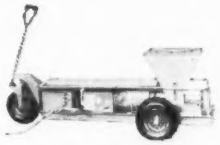


Miners work safely, operators get greater tonnage with complete MSA product lines. With these MSA products on the job, men and machines mine more coal safer, thriftier, and more efficiently than ever before possible. MSA serves mining everywhere with conveniently located warehouses and complete lines of safety equipment. When you have a safety problem, look to MSA for a solution.

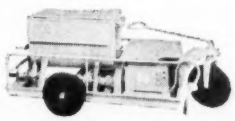
ROCK DUSTING AND DUST COLLECTING



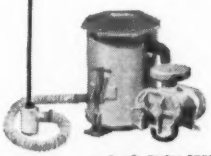
M-S-A Air Slide
Rock Dust Distributor
Bulletin No. 1201-7



M-S-A® Bantam 400 Rock Dust Distributor
Bulletin No. 1201-2



M-S-A® Slurry Rock Dust Distributor
Bulletin No. 1201-4



M-S-A® THRU-STEEL* Dust Collector
Bulletin No. 1207-1

RESPIRATORY PROTECTION

M-S-A® Self-Rescuer®
Bulletin No. EC-1

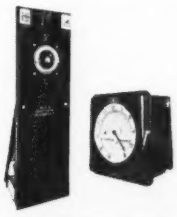
M-S-A® Dustfoe® 66 Respirator
Bulletin No. 1004-3

M-S-A® CHEMOX® Breathing Apparatus
Bulletin No. 8-14

M-S-A® McCaa® Two-Hour Breathing Apparatus
Bulletin No. 88-3

METHANE DETECTION

M-S-A® Methane Alarm
Bulletin No. 0809-2



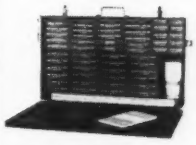
M-S-A® Methane Recorder
Bulletin No. 0706-1

M-S-A® Wolf Junior Flame Safety Lamp
Bulletin No. 0807-1

M-S-A® Methane Detector Type W-8
Bulletin No. 0809-4

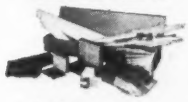
M-S-A® Methane Tester Type M-6
Bulletin No. 0809-3

FIRST AID EQUIPMENT



M-S-A® Miner's First Aid Cabinet
Bulletin No. 0401-2

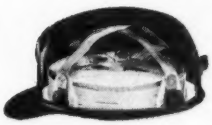
M-S-A® Jenkins Stretcher
Bulletin No. 0408-10



M-S-A® Emergency First Aid Outfit
Bulletin No. 0408-10

M-S-A® Unit First Aid Kits
Bulletin No. 0401-2

HEAD PROTECTION WITH FIXED-CROWN* SUSPENSION



M-S-A® Comfo Cap®
Bulletin No. 0601-3

M-S-A® Type K SKULLGARD® Hat
Bulletin No. 0601-4

PORTABLE INSTRUMENTS

M-S-A® Portable Oxygen Indicator
Bulletin No. 0817-1

M-S-A 10-Shot Blasting Unit
Bulletin No. 0901-4

M-S-A® Carbon Monoxide Indicator
Bulletin No. DS-3

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People in Coal

Hanna President Given Honorary Doctor of Laws Degree

JAMES HYSLOP, president, Hanna Coal Co. Div., Consolidation Coal Co., received an Honorary Doctor of Laws Degree at the 126th Founder's Day Observance at Marietta College, Marietta, Ohio, Feb. 14.

A native of Ayrshire, Scotland, "Jim" Hyslop came to America in 1906 and graduated from public school at Terre Haute, Ind., at the age of 13. He then started work as a laborer in the coal mines while taking an extended correspondence course in mathematics and engineering. He rose to the position of senior electrician in a large, fully-electrified mine by the time he was 16 yr old. In 1926 he became chief electrical and mechanical engineer for Walter Bledsoe & Co., advancing to general manager of operations in 1937. In 1940 Jim affiliated with the Hanna Coal Co. as general manager and was made president of Hanna in 1950.

He has been a leader in the development of mining machinery and is recognized as an authority on mine safety, Federal and State mining laws. Representing the coal industry in the development of the Federal Mine Safety Act of 1952, he also sponsored legislation in Ohio relating to mine safety, strip mine reclamation and stream pollution.

George L. May has been named superintendent, Cambria Div., Bethlehem Mines Corp. Mr. May succeeds **Jerome C. White** who has retired.

Harold B. Wickey, recently resigned vice president-operations, Glen Alden Corp., is going to Turkey for 3 yr for the Paul Weir Co., Inc. of Chicago.

Leonard J. Timms has been appointed state mines director of West Virginia, to replace **Crawford L. Wilson** who resigned effective April 15, Mr. Timms was general manager of mines, New River & Pocahontas Consolidated Coal Co.

Robert E. Lee Hall, National Coal Association general counsel, has been designated director of government relations in addition to his present duties. His new responsibilities resulted from the resignation of **Tom Pickett** who was vice president-government relations. Mr. Pickett has joined the Association of American Railroads in a vice presidential post.

Charles B. Baton, president and director, Baton Coal Co., has been elected a director of H. K. Porter Co., Inc. He started out as a surveyor in 1930 and became superintendent of Wilpen mine, Baton Coal Co. in 1934, progressing to vice president in 1938 and president 4 yr later. Besides being president and director of Greensburg Connellsville Coal & Coke Co. and the Farm Coal Co., Mr. Baton holds executive positions with several other coal companies and coal associations.

Robert L. Hair, general superintendent, coal mines, Colorado Fuel & Iron Corp., has retired after nearly 50 years of service devoted to safety with the company. Born in Latrobe, Pa., in 1885, he attended grade and high schools in western Pennsylvania and completed a civil engineering course at Ohio Northern University in 1908. His first job was with H. C. Frick Coke Co., Sub. of U. S. Steel Corp, after which he joined CF&I as mining engineer at Trinidad, Colo., in 1912. In 1916 Mr. Hair was transferred to the Walsenburg district and in 1921 returned to Trinidad as division engineer of both districts. He was moved to Pueblo in 1926 as general superintendent of coal mines and held that position until his retirement. Mr. Hair has played an important part in promoting accident prevention at all CF&I coal mines.

(*Continued on p 54*)

NEW!

Model P-1044
(U. S. Bureau of Mines Approval No. 2F-1587)

KERSEY "BIG WORK-HORSE"
Permissible Tractor

Indispensable emergency unit in case of power failure
Safest method for moving power centers in A. C. mines

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Simple, clean, rugged design for easy maintenance.

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All the power you need with 2-10 H. P. continuous duty motors.

Permissible, explosion-proof unit (approved by the Bureau of Mines) assures greater safety.

Wherever heavy duty permissible equipment is required, put the new Kersey "Big Work-Horse" Permissible Tractor on the job. This Model P-1044, 10,000 lb. rubber-tired tractor has all the features you want and need.

COMPLETE YOUR PERMISSIBLE EQUIPMENT LINE with!—

Kersey Model P-744, 4-wheel drive, steer and brakes, weighing 7,000 lbs. for smaller duty jobs in restricted mine travelways . . . and Kersey Model PPC-9 Permissible Personnel Car and Utility Tractor, which can also double as a tractor for towing supply and man-trip cars.

KERSEY MANUFACTURING CO. INC. BLUEFIELD, VIRGINIA

KERSEY MANUFACTURING CO., INC.
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When you want modern equipment for modern haulage and want the best — check with Kersey first

Coal Abroad

OEEC Members Framing National Energy Policies

The Organization for European Economic Cooperation has issued guidance to member governments for framing national energy policies. Members were urged to base solutions to energy problems on a series of conclusions drawn up by OEEC's Energy Committee. These conclusions, listed in the OEEC release, are:

. . . Long-term energy policy should be based on the assumption that there will "not" be any lasting shortage of energy supplies in western Europe before 1975. It should attach utmost importance to securing plentiful supplies of low-cost energy, at the same time leaving the consumer the greatest possible freedom of choice.

. . . Expansion of indigenous energy resources should be developed or encouraged only if they can be exploited in sound economic conditions. Governments should permit application of a more flexible price policy for coal and encourage better methods of marketing coal and other forms of energy. They should plan measures to provide rapid remedy for any shortages or surpluses, but make sure these measures have the smallest possible effect on the economic pattern of energy consumption.

. . . Fiscal policy should be designed so that taxes, charges and customs duties do not lead to preference of a less economical for a more economical form of energy. Transport rates must not be allowed to introduce an element of distortion into national and international competition. Governments must not prevent sound economic management of production, transport and distribution of the different forms of energy, and bodies controlled by public authorities should normally make sufficient provision in their prices for return on capital.

. . . Coal-producing member countries should encourage concentration of production in mines where prospects for productivity and cost are favorable and should take care that any action taken to overcome the technical and social difficulties of the coal industry does the least possible damage to the structure and economic development of the supply and use of energy as a whole. They should give thought to the possible difficulties that might be created by a pension scheme attached exclusively to the coal industry in the case of stable or slowly-declining employment in coal mining and take full account, when determining energy policy and economic policy in general, of the social and human problems involved in any reduction of employment in coal mining.

As this issue goes to press, member countries will be reporting to the OEEC on action taken in line with the above recommendations, having been asked to submit their reports by April 1.

Member countries of the OEEC include Austria, Belgium, Denmark, France, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and West Germany.

(*Continued on p 48*)

Each of these Okonite Cables has a specific mining function

Today's modern mining systems call for a variety of electrical cables, each designed for a different job—from power feeders . . . to flat type cables for shuttle cars . . . to blasting cable. To meet these numerous applications, Okonite has developed a complete line of job-designed cables. Some of them are shown above.

Okonite cables have proved their dependability through long years of service under the most rigorous conditions: tension, high temperature, abrasion, corrosive acids, fumes, oils, moisture and chemicals. This service record is no accident. It results from Okonite's continuous research and from a top-flight staff of mining cable experts who have acquired first-hand knowledge of our customers' problems.

The Coal Show is the ideal time for you to discuss cable selection with Okonite's Mine Electrical Engineer, Tom Weichel, and his team of cable consultants. They will be at booth 1301. At the same time, you'll see a proposed electrical system for tomorrow's mines, and learn how Okonite Cable'bility—quality cables for modern mining systems—pays off in safer, more economical power for your mine.

So, if you're anxious to operate your mine more efficiently with less downtime and greater profits, be sure to visit booth 1301 at the Coal Show. If you can't get to the show, let us know; we'll be happy to bring our part of the show to you.

THE OKONITE COMPANY
Subsidiary of Kennecott Copper Corporation
Passaic, New Jersey

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***where there's electrical power... there's* OKONITE CABLE**

EXPLOSIVES

ENERGY...

Have you checked into the many ways it can handle work that used to be done with mechanical energy . . . and do it cheaper, faster, more efficiently?

Lower TOTAL job costs can be your reward for examining ALL the ways in which explosives energy can work for you. For example, the J. A. Tobin Construction Company of Kansas City, Kansas did just this. On a section of the Turkey Creek Expressway, Interstate 35, there were no nearby homes or confining obstacles, so the objective was maximum breakage and production on every shot, together with efficient use of equipment. Gianite ammonium nitrate blasting agent was chosen for the task—low cost, ready to load, but with the wallop needed to do the job.

For this contractor, selection of the right primers, blasting agents, and blasting techniques meant more thorough and consistent breakage, more payload work out of each piece of his equipment, and minimum downtime from end to end of the job. This is just one example of efficient use of explosives energy. Others? . . . of course!

In coal stripping . . . with the help of the Atlas Representative, one operator discovered a way to eliminate almost one-half the total mechanical handling of overburden. He used explosives force to move rock directly to the spoil pile.

In open pit ore mining . . . production has been speeded, costs cut by "designing" the blast to create additional fragmentation, allowing much of the rock to bypass the primary crusher.

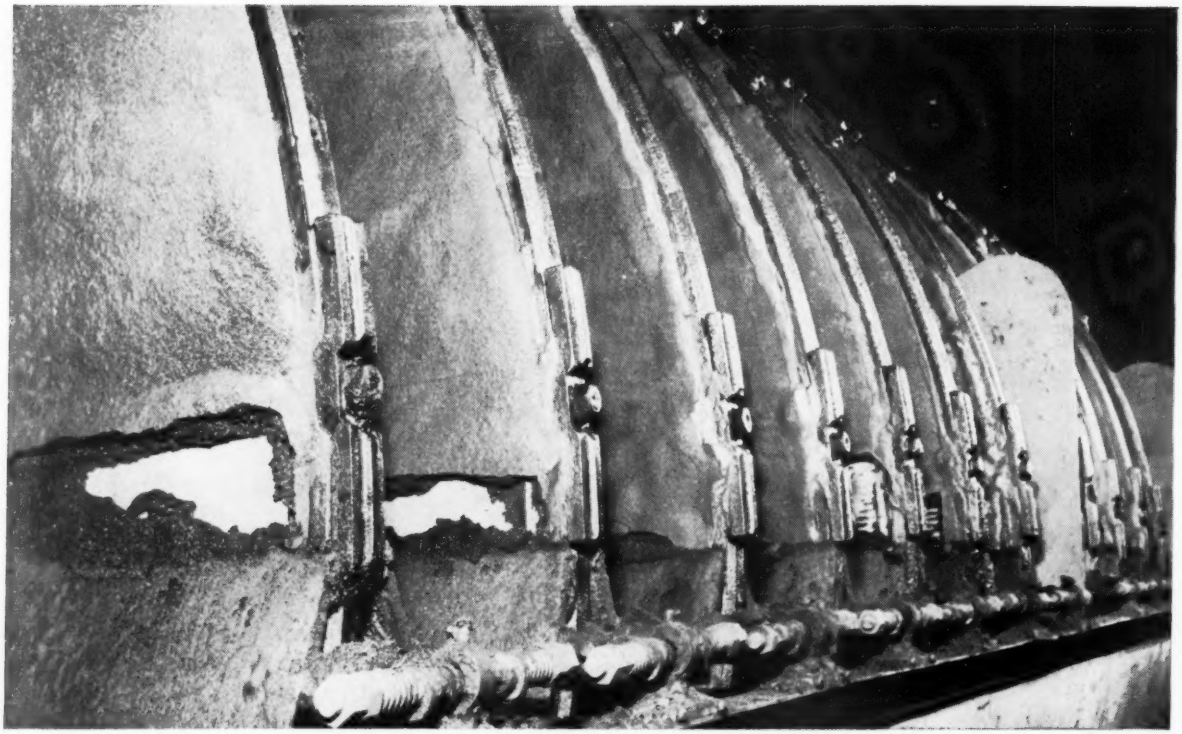
In quarrying . . . deliberate planning for thorough blasting (more than "just enough") saves more than its cost in reduced wear on crushers, wire rope, shovels—the whole gamut of equipment.

Efficiencies, and therefore savings, like these are available to you. Your Atlas Representative is both experienced and skilled in achieving these results in a wide variety of blasting conditions. There's no secret, unless it's knowing how to use the right combination of Atlas explosives, blasting agents (including *all* forms of ammonium nitrate), and blasting supplies for each job.

If you haven't checked your blasting methods lately, perhaps there's a new one Atlas can tell you about—the one that may be exactly the answer to help you reduce your overall costs. Look to Atlas' full line—the only full line in the industry. New, modern facilities are now in production at Joplin, Missouri to assure ready availability of all products. And to give you faster, more flexible local service, new distribution facilities are being established coast to coast. For assistance, call in your Atlas Representative, or write directly to:

ATLAS POWDER COMPANY
Explosives Division · Wilmington, Del.

ATLAS **ATLAS EXPLOSIVES**

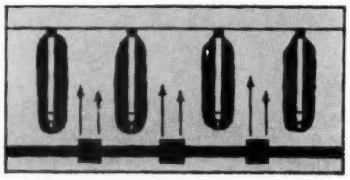


"Straight-Up" Agitation is Key to Profits with AGIDISC Filters

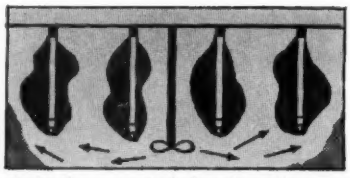
No cake scouring or segregation of coarse and fine particles with Eimco Agidisc filters. Exclusive "straight-up" agitation keeps fast-settling solids in suspension, resulting in uniform cake formation on discs, greatly improved dewatering and reduced recovery costs.

Agidisc filter's paddle agitator imparts a rolling movement to the slurry, parallel to the surface of the discs. The agitator revolves at just the proper speed for mixing — slowly enough so as not to disturb cake formation yet fast enough to keep coarse solids from settling. A variable speed control provides precision adjustment to critical speed.

Ask the Eimco representative in your area to help you estimate savings in your plant with Agidisc filters. Write Eimco Filter Division for Bulletin FA-2032.



Agitation pattern with Agidisc filter. Cake formation is uniform, with no lumps or end rim mussiness. Vacuum is equally effective everywhere on disc surfaces.



Agitation created by impeller or oscillator type devices results in lumpy, non-uniform cake formation and poor dewatering.

THE EIMCO CORPORATION

"Advanced Engineering and Quality Craftsmanship Since 1884"

Head Office: Salt Lake City 10, Utah, U. S. A.

FILTER DIVISION

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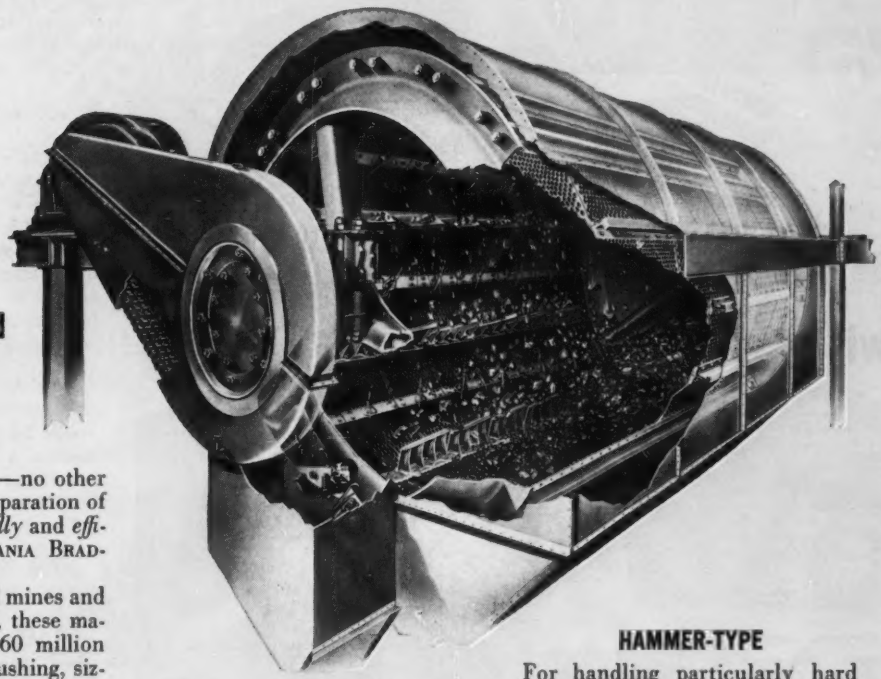
For maximum economy in preparation of ROM coal—it's PENNSYLVANIA BRADFORD BREAKERS



Trunnion-mounted
Roller-mounted
Hammer-type

Mine-side or plant-side—no other crusher handles the preparation of ROM coal as *economically* and *efficiently* as a PENNSYLVANIA BRADFORD BREAKER.

At power plants, coal mines and by-product coke plants, these machines prepare over 160 million tons of coal a year—crushing, sizing and scavaging all in one continuous operation, at capacities up to 1500 TPH, and at average maintenance costs as low as $.001 per ton and power consumption averaging .204 KW per ton.

ROM coal is continuously charged at loading end. Passing sizes are immediately screened out. Larger lumps are raised by radial lifting shelves and dropped, breaking along natural cleavage planes to desired screen size, with minimum fines.

Refuse such as bony, sulphur balls, slate and rock, resist breakage, are automatically discharged at the refuse end along with tramp iron, timbers, etc.

ROLLER-MOUNTED

Roller-mounted BRADFORD BREAKERS are particularly adapted for use at coal mines, as the spider at the loading end is designed to permit loading of extra large lumps of coal.

TRUNNION-MOUNTED

Trunnion-mounting, where the revolving cylinder is suspended on trunnions, is the popular type for plant-side installations.

HAMMER-TYPE

For handling particularly hard coals, or for heavier loading, the BRADFORD BREAKER is combined with a concentrically-mounted rotor of a hard-hitting PENNSYLVANIA HAMMERMILL at the rear end of the breaker.

Whatever the type most suitable for your need, if it's *economy* and *efficiency* you want—investigate PENNSYLVANIA BRADFORD BREAKERS. Write for catalogs, or call a Pennsylvania Engineer.

PENNSYLVANIA CRUSHER DIVISION
BATH IRON WORKS CORPORATION
WEST CHESTER, PENNA.

PENNSYLVANIA CRUSHERS
BATH-BUILT

INSTALLATION OF NEW OFFICERS of the Southeast Chapter of the American Institute of Mining, Metallurgical and Petroleum Engineers, took place Feb. 16 in Birmingham, Ala. New section chairman—J. W. Nicol, general superintendent of mines, U. S. Pipe & Foundry Co.; secretary-treasurer—M. M. Marchich, assistant general superintendent of mines, U. S. Pipe & Foundry; 1st vice chairman—L. S. Chabot Jr., chief engineer, Ore Mines & Quarry, TCI Div., U. S. Steel Corp.; 2nd vice chairman—C. K. Donohoo, American Cast Iron Pipe Co. Speaker at the session was Eugene K. Graham, assistant general superintendent, Fairfield Steel Works, TCI Div., U. S. Steel. Time out for a break is taken by 1960 Chairman E. P. Reed (left), manager, Raw Materials, TCI, U. S. Steel; J. W. Nicol; W. K. Graham and Program Chairman W. R. Kirkwood, assistant general superintendent, Coal Mines, TCI, U. S. Steel.

(*Continued from p 26*)

which will be delivered via river barge. The new facility will be designed to operate at an anticipated heat rate of about 8,500 British thermal units per kwhr of net generation—a new record in the efficiency of the conversion of the energy of coal into electrical energy. Construction will begin this summer, with completion expected by 1964.

Virginia Electric & Power Co. has been granted authority by West Virginia Public Service Commission to build and operate a $150 million steam electric generating plant in Grant County, W. Va. The 1,000,000-kw station will use 2.5 to 3 million tons of coal annually.

North American Coal Corp. is building a plant on the Ohio River near Powhatan Point, Ohio, to produce over 40,000 tons of alum (aluminum sulphate) annually from coal mine waste. Scheduled to begin production in August, 1961, the plant is a result of a research program started several years ago. Future company plans anticipate an expenditure of $450,000 in 1961 to ascertain the economic feasibility of the decomposition of alum to alumina—raw material for aluminum. If results of the pilot plant program for decomposition indicate that this process is economically feasible, the company then expects to construct facilities for this purpose as an addition to the alum plant toward the end of 1961.

A spark of hope was kindled for the depressed regions of Tennessee and Kentucky with the announcement by Herbert Vogel, TVA board chairman, that the new super TVA steam plant to be built in either the Cumberland or Clinch Rivers, will use coal from these areas. The 800,000-kw unit, to be the largest yet, will use an estimated two million tons of coal annually. Based on that, coal mines in the depressed areas could recall about 500 miners.

Late Bulletin: Site of Edgemoor, just outside Oak Ridge, Tenn., has been chosen for the TVA steam plant.

LET YOUR CARRIER INDUSTRY SPECIALIST FILL THIS GAP... EFFICIENTLY

FOR EXAMPLE, IS YOUR PROBLEM A MORE EFFICIENT METHOD OF MOVING *AND* COOLING HOT MATERIALS...MOVING *AND* DRYING MATERIALS? Your Carrier Vibrating Equipment Specialist has the specialized know-how that can fill the gap between problem and solution...between raw material and finished product...efficiently and economically.

Using the Carrier exclusive Natural Frequency Principle, vibrating equipment can be designed that will move hot materials, cool them en route, distribute or separate them...in one operation. Or others can be made that will elevate, dewater and dry *while* moving.

Why not have your Carrier Specialist study your operations with a view to reducing handling costs while increasing over-all efficiency. Remember, Carrier does more than just build equipment...we provide the specialized service that solves problems of moving and processing materials efficiently.

Call him or write Carrier Division of CHAIN Belt Company, 212 N. Jackson St., Louisville 2, Kentucky.

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NATURAL FREQUENCY
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SEE IT AT THE COAL SHOW . . .
NEW INDESTRUCTO MINING MACHINE CABLE

This reel is symbolic of quality mining machine cable. NATIONAL ELECTRIC'S *new* Indestructo cable will be introduced at the American Mining Congress Coal Show, Cleveland, May 15-18. Be sure to visit Booth 1512 for your preview of the most advanced approach to efficient, long lasting mine machinery operations. Strategically located in the heart of the coal mining industry, National Electric offers exceptionally fine personalized service and delivery. Complete catalog (No. 702) available upon request. Write to National Electric Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.

PORTER ***NATIONAL ELECTRIC DIVISION***
H. K. PORTER COMPANY, INC.

Current Coal Patents

Oliver S. North
Patent Research and Abstracting
Washington, D. C.

Process and apparatus for purifying suspensions of fine magnetizable particles in a liquid, C. Krijgsman (assigned to Stamicarbon N.V., Heerlen, Netherlands), Feb. 21, 1961. In the purification of suspensions of magnetic and magnetizable particles along with non-magnetizable impurities, e.g. Heavy-media slurries in coal washeries, the suspension is first introduced into a magnetic separator which recovers the bulk of the magnetic material, and the poorly magnetic fraction is then fed tangentially onto the concave side of a cylindrically curved, or "sieve bend", screening deck which passes the fine magnetizable particles but not the coarser waste typically found in washer slurries. No. 2,972,408.

Magnetic separation apparatus and treating methods involving separation, M. J. Greaves (assigned to Robert A. Cummings Jr., Pittsburgh, Pa.), Feb. 28, 1961. In the heavy media concentration of coal, the floated coal is removed from the surface and then a portion of the liquid is magnetically separated from the finely divided magnetic material contained therein while that material is maintained in a deflocculated state. The magnetic material is re-used in the heavy-media suspension and the liquid is filtered and used for washing the separated coal. No. 2,973,096.

Two-part metallic mine prop, W. L. G. Heusner (assigned to Hermann Schwarz K.G., Wattenscheid, Germany), Feb. 28 1961. Improved two-part metallic mine prop in which the mine prop members are locked by friction while being elastically deformed. This prop can be quickly set up by the use of fluid operable means, and rapidly taken down when it is to be removed. No. 2,973,178.

Scraper for removing coal dust and other materials from coal mine floors, F. J. Doyle, Mar. 7, 1961. Design for an improved scraper for gathering and removing coal dust and small scrap and waste from coal mine floors. When attached to the forward end of a conventional mine shuttle car, the scraper blade pushes the dust and waste into piles which can be easily removed by a coal loader or other suitable apparatus. No. 2,973,536.

Muck bailing attachment for mine skips, L. Taylor and L. C. Brown, Jan. 31, 1961. Design for a mine skip bailing attachment particularly suitable for use in coal mines for removing coal dust, dirt and water from the shaft bottom. The attachment can be easily and cheaply manufactured from readily available materials.

Preparation Facilities

Harmar Coal Co., Harmarville, Pa.—Contract closed with Eimco Corp. for refuse thickener, 85 ft in diameter. Heyl & Patterson froth flotation cells are being installed to handle 32 tph.

North American Coal Corp., Jensie Mine, E. Springfield, Ohio—Purchase authority issued to The Daniels Co. for a complete DMS dense-media precision coal washing facility, including dual-DMS precision dense-media coal washers with interlocked control and automatic maintenance of specific gravities —including all accessories and grading equipment to process 350 tph coal.

Pocahontas Empire Coal Co., Landgraff, W. Va.—Purchase authority granted The Daniels Co., Bluefield, W. Va., for a complete DMS dense-media precision coal washer with accessories to process 220 tph coal.

North American Coal Corp., Southern Div., Laurel Fork Mine, Mammoth, W. Va.—Purchase authority granted The Daniels Co. for a complete DMS dense-media precision coal washing facility including dual-DMS precision dense-media coal washers with interlocking circuits and automatic maintenance of specific gravities for initial capacity 400 tph.

Chapel Mining Co., Kingwood, W. Va.—Purchase authority issued to The Daniels Co. for a complete DMS dense-media precision coal washing facility, including all accessories and grading facilities, with dual-DMS precision dense-media coal washers with interlocking circuits and automatic maintenance of specific gravities, for initial capacity 150 tph.

Delmont Fuel Co., Hunkers, Pa.—Installation completed by Ridge Equipment Co. for three Ridge Airjigs to handle 225 tph of ⅝ minus coal.

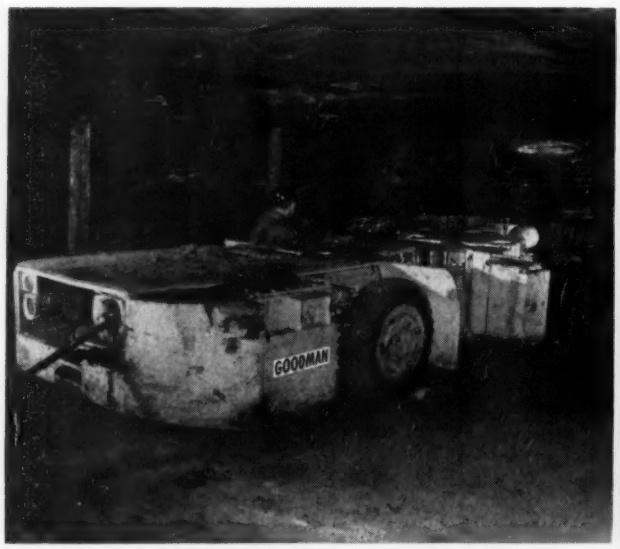
Mart Coal Co., Tunnelton, W. Va.—Installation completed by Ridge Equipment Co. for complete Ridge Airjig plant including Ridge vibrator feeder, Ridge rotary breaker and 55-tph Ridge Airjig to handle ¾x0 coal.

Freeman Coal Co., Orient Mine No. 5, West Frankfort, Ill.—Contract closed with Deister Concentrator Co., Inc., for 14 Concenco "77" twin-deck, Diagonal Deck coal washing tables to handle ¼x0 coal and 14 Concenco splitters for feed distribution.

CONVENTIONAL MINING

A profit package for

...CUTTING MACHINE



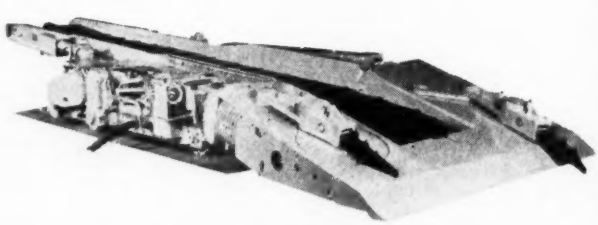
Extra cuts add up fast with a Goodman rubber tired cutter A high tramming speed gets you to the face in double-quick time, fast hydraulic cylinder movements position the cutting elements quickly, and "slewing" the machine while cutting is but a matter of seconds. A 90" wheelbase and balanced weight distribution makes maneuvering easy . . . and there's good road clearance, a life saver for tires. Motors are custom designed and built by Goodman.

The Goodman line includes machines that top, center, bottom cut and shear, others that can be arranged for either top or bottom cutting.

. . . LOADER

A powerful Goodman Loader is the key to high-capacity loading in low, intermediate or high coal. All models combine speed with maneuverability and power to spare. Wide, deep conveyors contain surge loads, gear driven clutch controlled tramming eliminates the need of reversing tram motors electrically—permits fast loading movements at the face. Motors, Goodman designed for loading service, are interchangeable; contactor control is simple because of one-direction only tram motors.

Goodman loaders offer rated capacities from 10 to 20 tons per minute, height ranges from 24 to 38 inches. All are mine-proved.



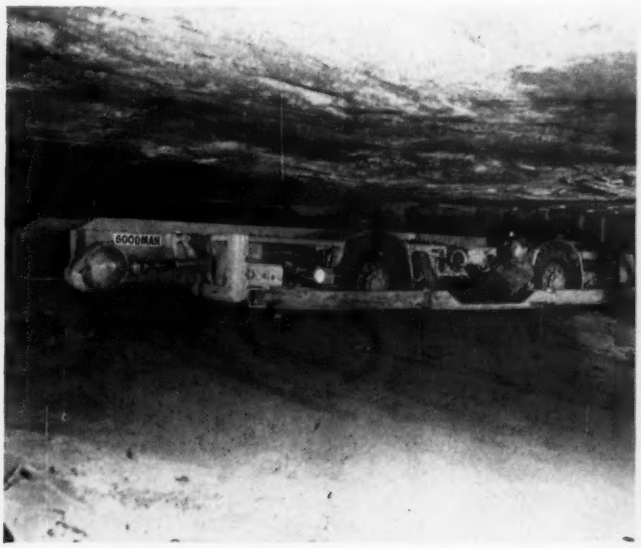
GOODMAN MANUFACTURING COMPANY

Halsted Street and 48th Place, Chicago 9, Illinois

with GOODMAN EQUIPMENT

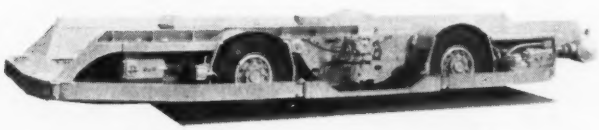
today's progressive mine

. . . SHUTTLE CAR

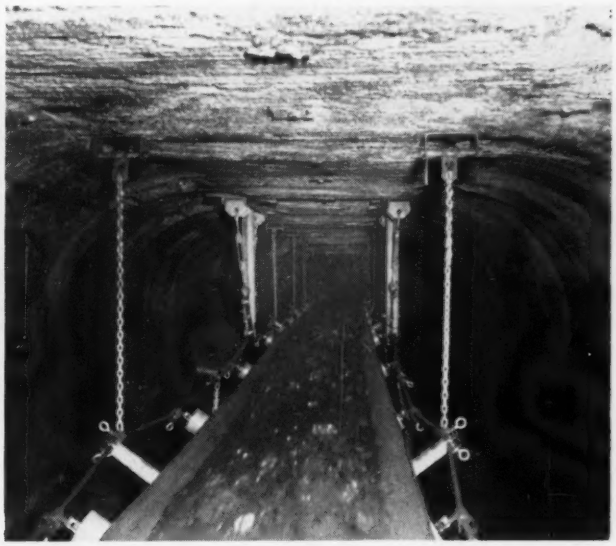


Capacity for surge loads, speed for quick-trip transfer of loads, and structural strength that promotes continuous service—these are the profit-making advantages of each car in the complete Goodman line. Add to them such standard features as 4-wheel power steering, 4-wheel drive, 4-wheel disc type brakes with independent hydraulic system, smooth low or high speed control through a 2-position foot switch and you can be sure of maximum return for dollars invested.

Goodman cars are in sizes to suit any workable seam. Team them with Goodman cutters and loaders to make your operation pay off.



. . . ROPEBELT® CONVEYOR



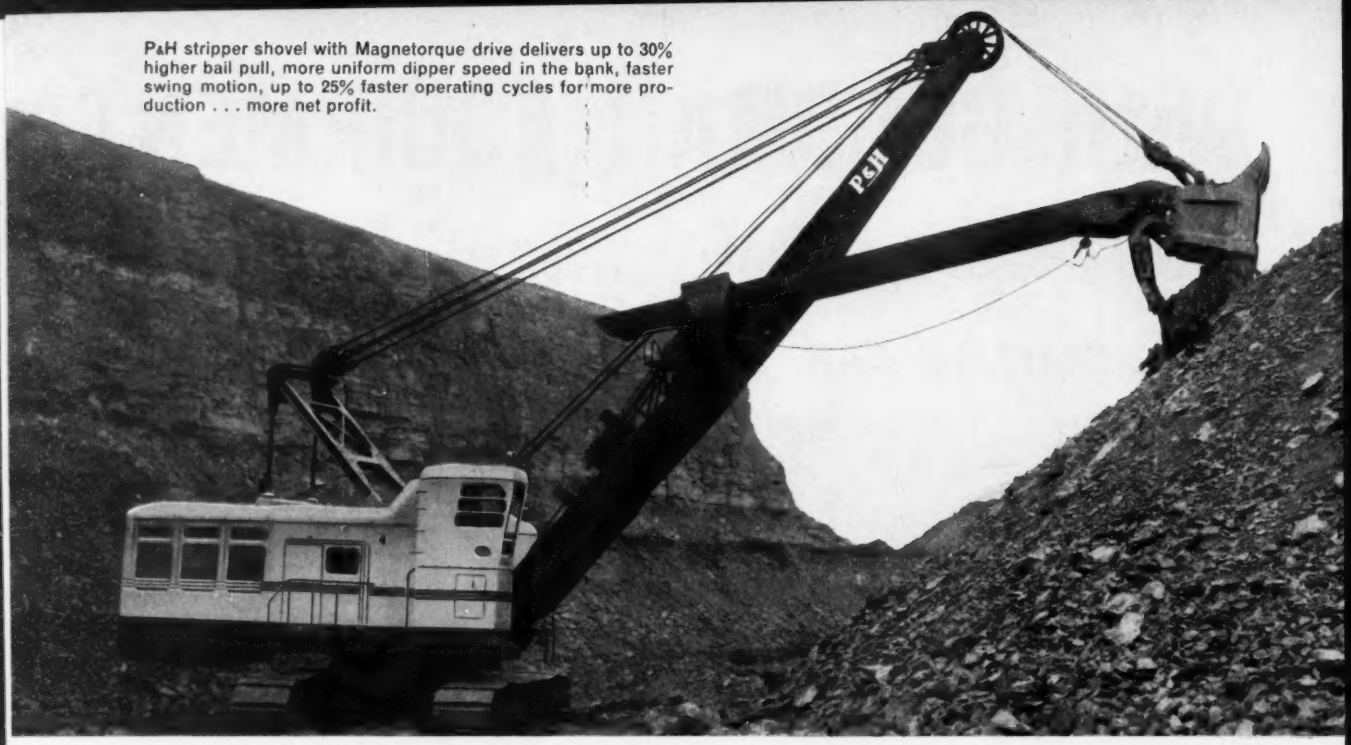
Here's the ideal haulage unit to match today's high-speed, high-capacity production. Component parts for intermediate sections are easy to handle, fast to install and are adaptable to any application—headings, panels, main line or slope. Rope belts can be roof suspended or ground mounted, offer superior carrying capacity either way. Initial costs are moderate, maintenance costs low. Cost savings, coupled with operating advantages, have been proved at scores of installations.

New adjustable hanging return roller can be spaced to suit load conditions. Crowned roller exerts strong belt training influence.

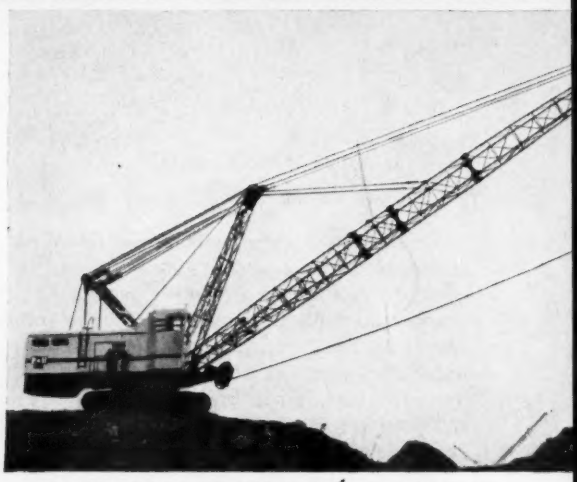
See it all at the Goodman Exhibit . . . 1961 Coal Show

A complete line of equipment for conventional and continuous mining systems.

P&H stripper shovel with Magnetorque drive delivers up to 30% higher bail pull, more uniform dipper speed in the bank, faster swing motion, up to 25% faster operating cycles for more production . . . more net profit.



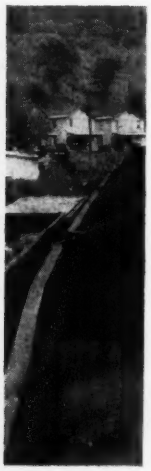
3½-yard P&H diesel excavator features long crawlers and Magnetorque drive for swing and propel motions. Equipped with 48-ft. boom and a 34-ft. dipper handle for economical stripping operation.



P&H 1855 is fully convertible for long range dragline service. It is the largest excavator mounted on a single pair of crawlers—unmatched for maneuverability.

1½-yard P&H excavator loads coal into trucks. Exclusive P&H Magnetorque drive for swing and propel motions delivers the smoothest, fastest, most accurate swings and "move ups" known in the industry.

Versatile P&H truck crane for handling material at mine siding and a variety of utility jobs. Highly mobile unit features quick, easy change-over of front end attachments—from crane, hoe, dragline, shovel, clamshell.



It pays to standardize on P&H...

P&H WITH MAGNETORQUE® DRIVE GETS DOWN TO COAL FASTER... LOADS IT OUT QUICKER

It's good business to standardize on P&H electric shovels and draglines, diesel excavators and truck cranes for all your needs . . . big, medium or small . . . There's a size and type for every job.

Full-Electric and Diesel-Electric Shovels and Draglines from 3½ to 10 yards—Big, rugged electrics that deliver up to 10% more production with exclusive MAGNETORQUE drive—the most productive work-motion drive known for mining excavators. The system that electro-magnetically transmits driving energy of the power plant (A.C. electric motor or diesel engine) direct to the work motions, without intermediate conversion to D.C. current.

Diesel Excavators from ½ to 4 yards—Workhorse machines that pay for themselves fast with increased production . . . higher job availability. Among the various models you find important bonus features—such as: Magnetorque—powered swing that delivers the fastest, smoothest swing motion in the industry . . . Sealed Power Box design with all gears running in an oil bath, completely sealed from dust and dirt for trouble-free, maintenance-free operation . . . Quick, on-the-job convertibility from shovel to dragline service.

Versatile Truck Cranes from 12½ to 80 tons—Highly maneuverable, powerful truck cranes that keep your big crawler excavators free for production . . . Mobile units ideally suited for handling secondary road-building, refuse disposal, drainage, erection, maintenance and 101 utility jobs. . . . Truck cranes that can be changed in the field to any front-end attachment quickly, easily and without special tools.

See for yourself why more mines today are standardizing on P&H equipment. There is a reason . . . Harnischfeger offers you more advanced designs, new concepts in engineering that pay off in increased production and lower operating costs.

Compare before you buy—write today for more information.

HARNISCHFEGER
Milwaukee 46, Wisconsin

P&H
CONSTRUCTION & MINING DIVISION

Please Come See Us — Cleveland Coal Show, May 15 to 18 — P&H Booth 701

Coal Abroad *(Continued)*

OVERSEAS FLASHES

JAPAN—American coal operators seem to be setting long-range sights on the Japanese steel industry in view of recent developments. Several months ago a Pacific Coast coal company signed a 4-yr contract with eight Japanese steel producers for shipment of 800,000 tons of coal to Japan (*Coal Age*, March, 1961, p 26). Since then three Japanese steel firms have dispatched a 7-man coal survey team to the U. S. for the purpose of determining the possibility of developing coal mines in the West Virginia area jointly with the American coal companies initiating the suggestion. The Norfolk & Western Ry. Co. sent a representative to Japan requesting detailed information on formulating coal development and export programs for the railway's coal to Japanese steelers. According to Japanese steel circles, 10 yr from now Japan will import half its coal needs, or 15 million tons, from the U. S.

INDIA—The mining development portion of India's Third 5-Yr Plan will utilize $20 million out of the $50 million loan recently agreed upon by the Export-Import Bank. Industrial machinery will receive $27 million and transportation and communication, $3 million.

GREAT BRITAIN — A 2,000,000-kw steam power plant which will burn 5,000,000 long tons of low-grade coal annually is to be built by Britain's Central Electricity Generating Board. The plant will be the first of two coal-fired stations the board intends to build in Nottinghamshire to burn fuel from the Midlands coal field.

Bituminous Output

YEAR TO DATE	PRODUCTION
March 11, 1961	69,620,000
March 12, 1960	85,721,000
1961 output 18.8% behind 1960	
WEEK ENDING	PRODUCTION
March 11, 1961	6,100,000
March 12, 1960	8,054,000

Anthracite Output

YEAR TO DATE	PRODUCTION
March 11, 1961	4,045,000
March 12, 1960	3,815,000
1961 output 6.0% ahead of 1960	
WEEK ENDING	PRODUCTION
March 11, 1961	307,000
March 12, 1960	380,000

UMWWF Trustees Suit Dismissed

The United Mine Workers Welfare Fund trustees named in the $30 million anti-trust suit brought several months ago by a group of Tennessee coal operators, have successfully sought dismissal of the suit as it pertains to them. Judge Leslie R. Darr said the sole question was whether the fund, as the plaintiffs claimed, constitutes an unincorporated association or organization and he ruled it does not.

The suit charged conspiracy to control production and price of all coal in the Southern Appalachians. Also named as defendants in the action were the UMWA, West Kentucky Coal Co., Cyrus W. Eaton, TVA and the L&N R. R.

Judge Darr ruled that Cyrus Eaton could not be sued in the case unless he voluntarily came into Tennessee or the suit was filed in an Ohio Federal court district.

Meanwhile, the Louisville & Nashville R. R. has asked that the action as it applies to L&N be dismissed or at least that the coal operators be required to detail their complaint and support it with a brief.

Lehigh U. to Drop Mining Course

Plans to discontinue its Department of Mining Engineering have been announced by Lehigh University, Pa., though no final date for concluding the activities of the department has been set. The discontinuance was based on a study of the College of Engineering which revealed that the need for mining engineers, particularly in the anthracite region, had dwindled to almost nothing in the past few years. Also, the decline in employment has resulted in a proportionate diminishing in student interest.

UMW Sued for Acts of Violence

Four lawsuits totaling $2,935,000 were filed in U. S. District Court, Knoxville, Tenn., against the United Mine Workers Union. The suits charge the UMW was responsible for several incidents of violence in East Tennessee coal fields in 1959 against mine operators.

Suits were filed by Double Camp Mining Co. for $1,475,000; Lyle's Coal Co., $150,000; Parton Coal Co., $550,000; and Allen Trucking Co. and others of Oliver Springs, Tenn., $760,000.

Classifying Coal

Committee D-5 on Coal and Coke of the American Society for Testing Materials has organized a new subcommittee on statistics to establish uniform practices within the committee for obtaining and analyzing data on precision of coal and coke test methods. The coal classification subcommittee was reactivated to review existing standards on classification of coal and will review and explore new developments in both domestic and foreign coal classification.

Mines, Companies

Harmar Coal Co. reopened its Oakmont mine in Barking, Pa., near the end of February, returning a group of happy miners to their jobs. The mine had been closed for 7 mo.

Consolidation Coal Co. acquired from the Pittston Co. the Crucible mine, formerly owned by the Crucible Steel Co. No plans have yet been made for immediate operation of the presently-idle mine located in Green County, Pa. According to a company official, the property had been acquired to provide Consol with additional reserves of high quality metallurgical coal.

Consol No. 63 mine, Mountaineer Coal Co. Div., Consolidation Coal Co., after 70 yr of continuous operation and over 35 million tons of coal production, finally has run out of coal and closed down permanently Feb. 23. All machinery, equipment and steel rails will be removed immediately and the mine openings sealed.

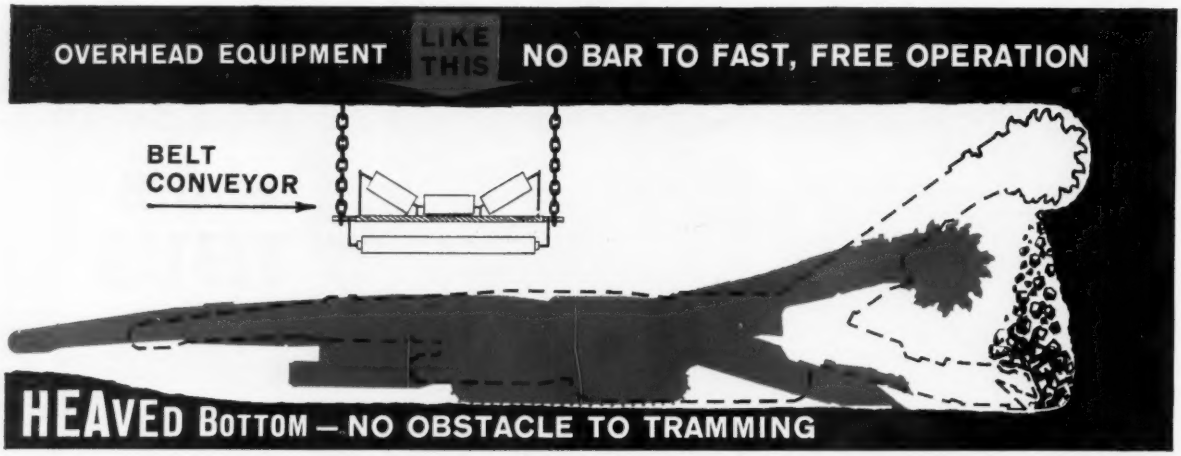
Competition

Once again the key issue emerges of whether private industry or the Government should bear primary responsibility for developing and building atomic power plants. Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, appeared to have endorsed the Eisenhower policy of supporting a cooperative program with the Government furnishing research and development assistance to utilities. President Kennedy presented the following policy for development of atomic power: "Our efforts to achieve economically competitive nuclear power before the end of this decade in areas where fossil fuel costs are high will be encouraged through basic research, engineering development and construction of various prototypes and full-scale reactors by the Atomic Energy Commission in cooperation with industry."

TRAMS OVER AND UNDER OBSTACLES

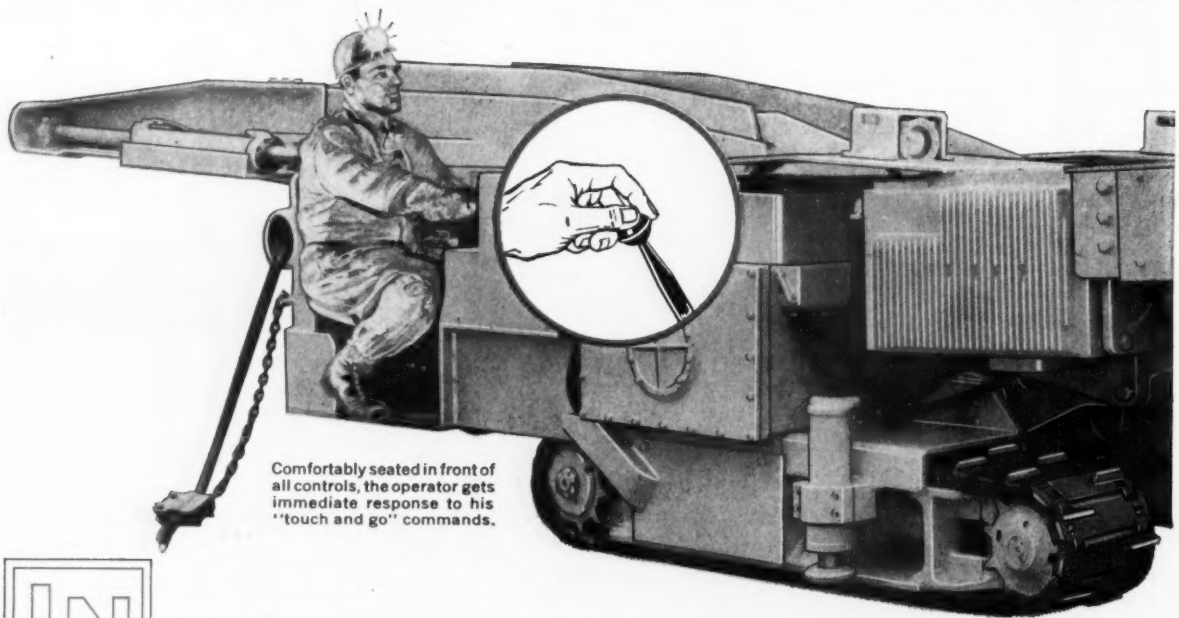
Lee-Norse CM38

"TOUCH AND GO" VERTICAL ACTION



"Touch and Go" vertical action sends these modern miners to the face, cutting deeper and higher . . . trams them without stoppages from obstacles above or below.

Lee-Norse Miners take heaved bottoms in stride; negotiate overhead obstructions! Low tramming action assures ease of maneuverability—over or under—with "Touch and Go!"



Comfortably seated in front of all controls, the operator gets immediate response to his "touch and go" commands.

Lee-Norse Company CHARLEROI, PENNA.
SPECIALISTS IN COAL MINING EQUIPMENT

Coal High or Low?... Lee-Norse MINERS keep production on the go!

–CUTS HIGH AT THE TOUCH OF A FINGER

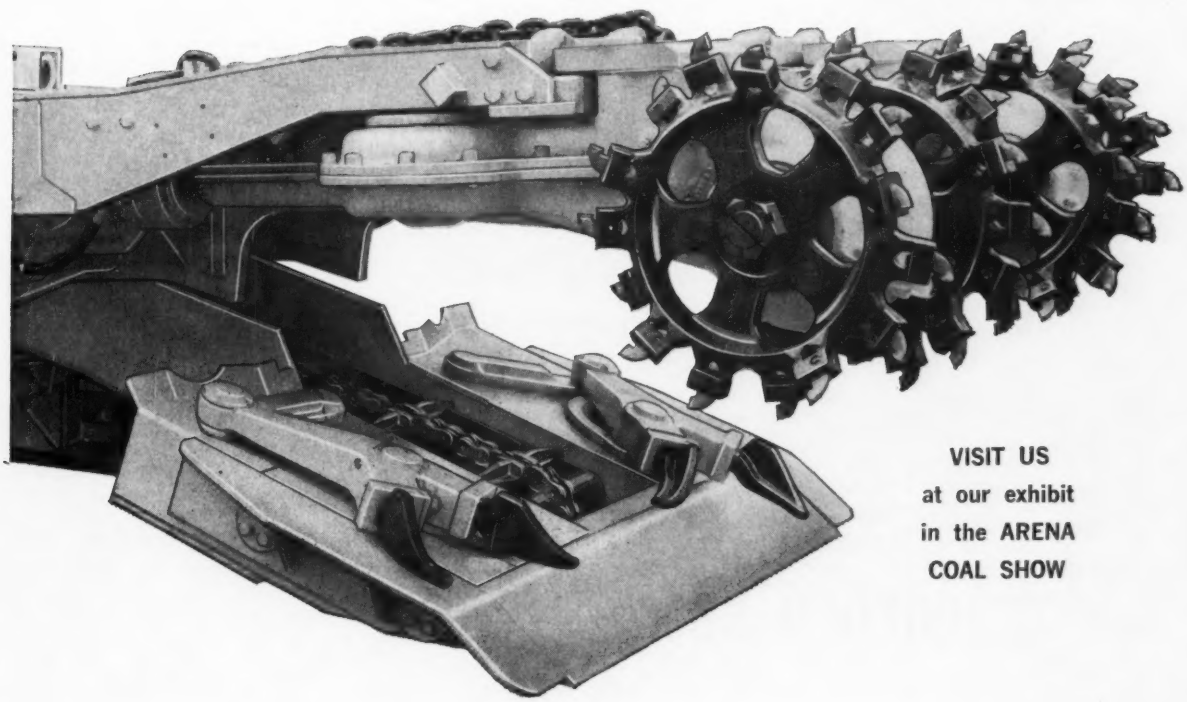
and CM48 MINERS

gives the Lee-Norse Miners these 3 features:

1. TRAMS LOW—CUTS HIGH
2. CONTROLLABLE CUTTING HEIGHTS
3. SELECTIVE MINING ABILITY

Uneven seams—high or low—they make no difference! Those powerful cutters spin just as fast and efficiently at 42 inches as they do at 120 inches.

Finally, the Lee-Norse Miner, with these low tramming and high cutting features will up your production and flatten out your operating and maintenance costs.



VISIT US
at our exhibit
in the ARENA
COAL SHOW

People in Coal (*Continued*)

J. D. Kalasky has been promoted from ventilation engineer to project engineer, Eastern Gas & Fuels Associates. He was formerly resident engineer at Eastern's Keystone mine.

Executive personnel of the new Reading Anthracite Co., purchased from Philadelphia & Reading Corp. by **John B. Rich** Feb. 2, have been announced. Mr. Rich will be chairman of the board and his son, **John W. Rich,** will be executive vice president. **John W. Barrett** has been named president and **Charles Brown** will remain vice president and general manager, both to continue to maintain headquarters at Pottsville. **William R. Dougan** will continue as vice president–sales, at New York. **George J. Clark,** former president of Reading Anthracite, will remain with P&R heading a new unit called the Reserve Carbon Corp.

Several personnel changes in the Pocahontas Fuel Co. Div., Consolidation Coal Co., have been announced. **M. M. O'Brien** was transferred from general superintendent, Itmann Mine, to the same post at Bishop and Crane Creek Mines. He will also be in charge of currently inactive Amonate and Jenkinjones Mines. **G. L. Asbury** has been promoted from superintendent to general superintendent, Itmann Mine.

Kenneth S. Hobbs has been named general manager, General Department Stores division, Eastern Gas & Fuel Associates, succeeding **B. P. Romero.** Eastern operates retail department stores and gasoline service stations in West Virginia, Pennsylvania and Ohio, mainly in coal mine communities. A veteran of 13 yr with the Eastern Coal Div., Mr. Hobbs joined as supply clerk at its Melcroft, Pa. mine. For the past 3 mo he served as assistant general manager, General Department Stores.

Richard C. McCandless is the new superintendent, Consol No. 32 mine, Consolidation Coal Co., replacing **H. T. (Tom) Kelly** who has retired after 41 yr service with the company.

A. V. Gibson, formerly general superintendent, has been appointed general manager of mine, New River & Pocahontas Consolidated Coal Co., effective April 15.

Association News

Colorado & New Mexico Coal Operators Association elected the following officers at their annual meeting in Denver, Colo.: President–**B. R. Noe,** North Fork Coal Co.; 1st vice president–**Robert F. Bowie,** Juanita Coal & Coke Co.; 2nd vice president–**W. W. Brown,** Edna Coal Co.; secretary-treasurer–**O. M. Hanks,** Colowyo Coal Co.

Obituaries

Garold Ralph Spindler, director of the School of Mines and professor of mining engineering at West Virginia University, died suddenly Feb. 20 in Morgantown, W. Va. He became an instructor in the Mining Extension Dept. in 1935, was assistant director of the School of Mines from 1941-43, and assumed the directorship in 1949. Dean Spindler was a consulting mining engineer for the British Ministry of Fuel & Supply and lecturer on mine mechanization at the University of Sheffield in England from 1943-45; chief of the West Virginia Department of Mines, 1945-47; and European technical advisor for Joy Mfg. Co., 1947-48. Active in the National Mine Rescue Association and chairman of the finance committee for the 1961 National

(*Continued on p 64*)

NEW WAY
to lower stripping costs

The Mullet Coal Co., Wilmot, Ohio, is using a 4500 VICON hi-lift shovel with 60 ft. boom and 4½ yd. dipper to strip sandrock, shale, and clay overburden varying in depth from 30 to 35 ft. Making a full 80 ft. cut over the coal seam, the VICON moves an average of 500 yds. per hour.

MANITOWOC

SEE WHY THREE OHIO STRIP MINES ARE MOVING MORE OVERBURDEN WITH THE NEW MANITOWOC 4500 VICON

Detailed field reports prove that the revolutionary new Manitowoc VICON is paying off in added output in strip mining areas everywhere. There are three good reasons why the new VICON is bringing substantial yardage increases to the owners of the strip mines pictured here —and at lower cost.

ONE. INTEGRATED CONTROLS — VICON operating levers are a combined linkage of clutch control *and* throttle with response balanced so that clutches are applied prior to engine acceleration. Clutch engagement, therefore, is faster, smoother . . . slippage, and subsequent wear, is greatly reduced. This is "Variable Independent Control" (VICON) provided for each operational function.

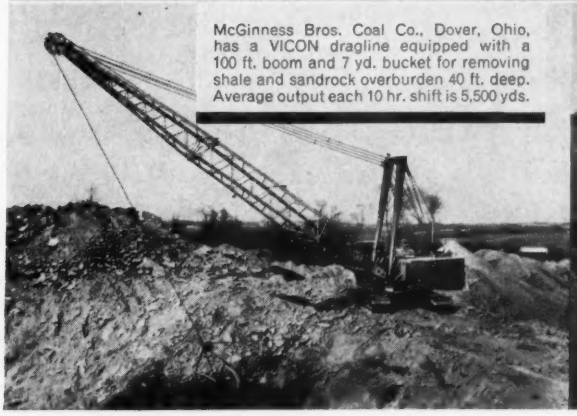
TWO. INTERLOCK, a key feature of VICON design for dragline operations. Hoist and drag drums are interlocked to automatically synchronize their operation. With Interlock, cycle time is faster and output greater because full horsepower is always available for hoist—the operator doesn't "soak it up" with the drag brakes. Operating costs are noticeably less, too, because brake use is cut 50% and lining wear is drastically reduced. Bucket control is unsurpassed.

THREE. DUAL INDEPENDENT ENGINES enable the operator to perform several functions simultaneously with full power instantly available for each function. They provide an infinite variety of hoist and swing speed combinations without the *conventional* problem of clutch slippage, and permit the operator to match the speed of separate phases of each cycle to existing job conditions.

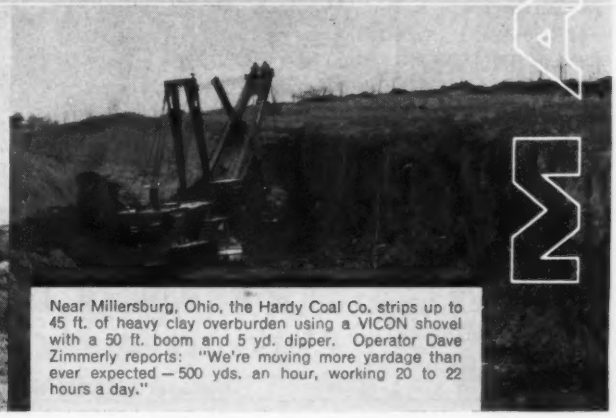
There are many other reasons why the Manitowoc VICON is the only *really new* excavator design since steam. If you are planning on a new stripper or loader soon, get full VICON information from your Manitowoc distributor, or write for details.

MANITOWOC ENGINEERING CORP.
(A subsidiary of The Manitowoc Company, Inc.)
MANITOWOC, WISCONSIN

SHOVELS 1¼ to 6 YDS. — Manitowoc — **DRAGLINES** 1¼ to 7 YDS.



McGinness Bros. Coal Co., Dover, Ohio, has a VICON dragline equipped with a 100 ft. boom and 7 yd. bucket for removing shale and sandrock overburden 40 ft. deep. Average output each 10 hr. shift is 5,500 yds.

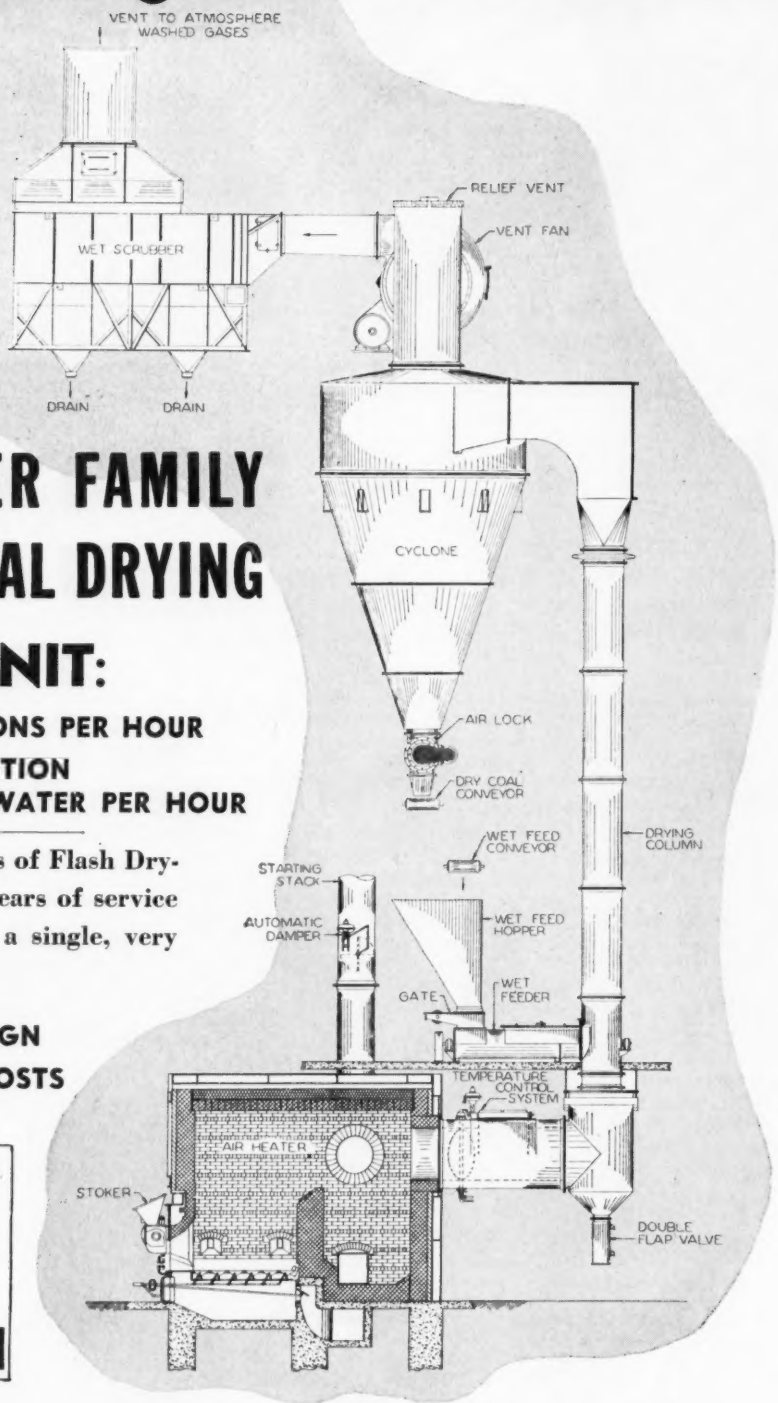


Near Millersburg, Ohio, the Hardy Coal Co. strips up to 45 ft. of heavy clay overburden using a VICON shovel with a 50 ft. boom and 5 yd. dipper. Operator Dave Zimmerly reports: "We're moving more yardage than ever expected — 500 yds. an hour, working 20 to 22 hours a day."

Announcing an Addition

TO THE

RAYMOND
FLASH DRYER FAMILY
FOR FINE COAL DRYING



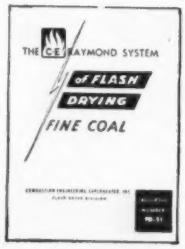
A SUPER UNIT:

CAPACITY — 175 TONS PER HOUR
MOISTURE EVAPORATION
38,000 POUNDS OF WATER PER HOUR

Maintaining the principles of Flash Drying as proved in twenty years of service —and now combined in a single, very high, capacity unit.

SIMPLIFIES PLANT DESIGN AND REDUCES PLANT COSTS

Write for Raymond COAL DRYING Bulletin No. FD-51



COMBUSTION ENGINEERING, INC.
Raymond Division
427 WEST RANDOLPH ST.
CHICAGO 6, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

Better products, *faster*, from your National Seal distributor:

This is no surprise package

When you open a box of National Oil Seals, you know exactly what to expect . . . a quality product. Micro-Torc® leather and Syntech rubber seals are results of the finest engineering, design and testing techniques. They protect bearings better and longer.

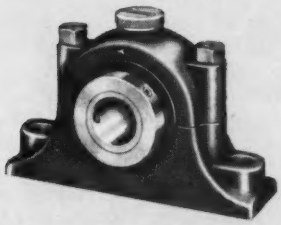
To keep machinery running smoothly, replace used seals with new National Oil Seals. Your bearing specialist will help you set up a service stock with the right seals to keep your standby inventory in balance. (National Oil Seals are phosphate coated to protect against rust and corrosion while in the crib or shelf.) Call him today.

NATIONAL OIL SEALS

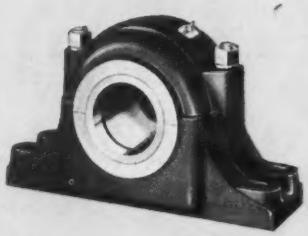
FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

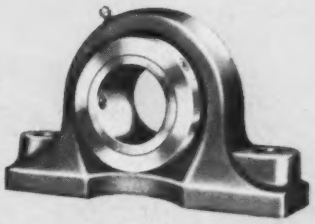
See all these bearings at the CLEVELAND COAL SHOW—Dodge Exhibit, Booth 906



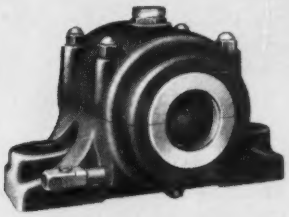
DODGE PILLOW BLOCKS WITH TIMKEN TAPERED ROLLER BEARINGS



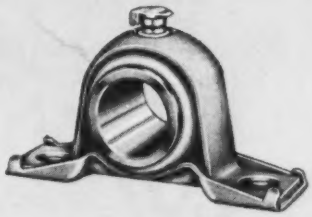
DODGE SPHER-ALIGN PILLOW BLOCKS WITH SPHERICAL ROLLER BEARINGS



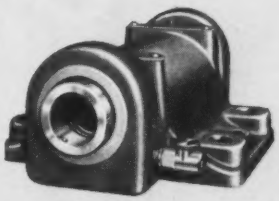
DODGE BALL BEARING PILLOW BLOCKS



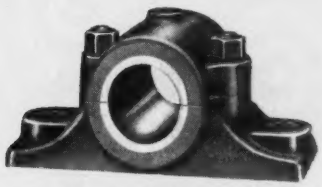
DODGE SLEEVOIL PILLOW BLOCKS



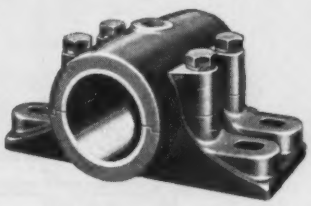
DODGE BRONZOIL PILLOW BLOCKS



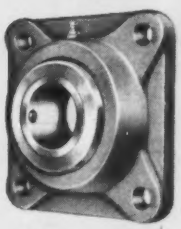
DODGE BRONZE BUSHED PILLOW BLOCKS



DODGE JOURNAL BEARINGS SOLID AND SPLIT



DODGE HEAVY RIGID PILLOW BLOCKS



FLANGE BEARINGS: HANGER BEARINGS: BEARING UNITS: TAKE-UPS

● **Dodge Pillow Blocks with Timken Tapered Roller Bearings.** America's quality pillow blocks. Assembled, lubricated, adjusted and sealed at the factory. 5 types for varying needs.

● **Dodge Spher-Align with Spherical Roller Bearings.** Rugged heavy duty, compact, inherently self-aligning. Exclusive Micro-Mount simplifies installation.

● **Dodge Ball Bearing Pillow Blocks.** Deep groove ball bearings with long inner races—high capacity. SL, SC and SCM models for light, normal and medium service respectively.

● **Dodge Sleevoil Pillow Blocks.** Ultra quality . . . extra long life . . . accessibility . . . *quiet*. Plain or water-cooled.

● **Dodge Bronzoil Pillow Blocks.** Efficient, low cost pillow blocks with self-oiling, capillary bronze bushings. Self-aligning. Large oil reservoirs.

● **Dodge Bronze Bushed Pillow Blocks.** Quiet fan and blower pillow blocks with two bronze bushings of high lead content mounted in one cast iron housing.

● **Dodge Journal Bearings—Solid and Split.** True running, dependable. Babbitted bearings with precision machined bores and faces. Finished bases.

● **Dodge Heavy Rigid Pillow Blocks.** Rugged, carefully bored, babbitted pillow blocks for many applications requiring grease lubrication. Finished bases and ends.

● **Bearing Units.** A wide variety—spherical seat, cartridge, flange, hanger, screw conveyor hanger, take-up. Ball, Roller and Sleeve types.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the *white* pages of your telephone directory, or in the yellow pages under "Power Transmission Machinery."

DODGE

of Mishawaka, Ind.

Coming Meetings

Sixth Annual Minerals and Petroleum Conference, Southwestern Alaskan Chapter, AIME, April 7-9, 1961—Anchorage, Alaska.

Tenth Coal Industry Management Workshop, Pennsylvania State University, April 9-14, 1961—White Sulphur Springs Hotel, Mann's Choice, Bedford County, Pa. Hotel accommodations limit registration to 35.

Twelfth Annual National Conference and Convention, American Institute of Industrial Engineers, Inc., May 11-13, 1961—Sheraton Cadillac Hotel, Detroit, Mich.

1961 Coal Show, American Mining Congress, May 15-18, 1961—Cleveland, Ohio. Cleveland Hotel Reservation Bureau, 511 Terminal Tower (Telephone: MAin 1-4110).

Sixth Annual Appalachian Underground Corrosion Short Course, June 6-8, 1961—West Virginia University, Morgantown, W. Va.

Forty-Fourth Annual Meeting, National Coal Association, June 6-8, 1961—Mayflower, Washington, D. C.

Gordon Research Conferences on Chemistry of Coal, June 12-Sept. 1, 1961—June 12-16 sessions on Science in Preparation of Coal to be held at New Hampton School, New Hampton, N. H. For additional information write W. George Parks, director, Dept. of Chemistry, University of Rhode Island, Kingston, R. I.

Eleventh Annual Short Course in Coal Preparation June 12-July 21, 1961 — West Virginia University, Morgantown, W. Va.

Fifty-first Annual Convention, Mine Inspectors' Institute of America, June 19-21, 1961 — Penn-Sheraton Hotel, Pittsburgh, Pa.

Rocky Mountain Coal Mining Institute Meeting, June 25-28, 1961 — Hotel Colorado, Glenwood Springs.

International Briquetting Association Conference, Aug. 28-30, 1961—Jackson Lake Lodge, Jackson, Wyo.

National First-Aid and Mine-Rescue Contest, Oct. 2-4, 1961—New Public Auditorium, Pittsburgh, Pa.

Coal Division Conference, American Mining Congress, Nov. 17, 1961 — Penn-Sheraton Hotel, Pittsburgh, Pa. Coal Division Committee Meetings:

Aug. 9, Roof; Aug. 10, Mechanical Mining; Aug. 11, Haulage; Daniel Boone Hotel, Charleston, W. Va.

Aug. 22, Coal Prep.; Aug. 23, Power; Brown Hotel, Louisville, Ky.

Aug. 25, Strip; McCurdy Hotel, Evansville, Ind.

Aug. 31, Safety; Sept. 1, Research; Sheraton Park, Washington, D. C.

"T-1" Steel saves 50% in welding rod costs alone

"Copper mining is awfully rough on equipment so we're always interested in ways to lower operating costs," explained Mr. Edgar Kellis, Purchasing Agent for Bagdad Copper Corporation, Bagdad, Arizona. "Our truck fleet hauls over 16,000 tons of ore and waste rock daily . . . which causes tremendous abrasion and wear to the truck bed liners.

"For this reason it's important to use the toughest possible steel. But it's equally important that the steel be easily fabricated and reasonably priced because even the toughest steel will ultimately wear out. The steel we used previously created shop problems with the end result that our costs were extremely unsatisfactory," Mr. Kellis said.

"By using USS 'T-1' Steel some of our costs have been reduced—the 'T-1' Steel wears much better—shop practices have been simplified—in fact we are saving one half in our welding rod costs alone, when welding USS 'T-1' Steel," reported Mr. Kellis. "We're also using 'T-1' Steel as wear plates in our shovels where it lasts about a year. Future plans call for 'T-1' Steel to be used in both the ball mill feeders and crusher chutes."

USS "T-1" Constructional Alloy Steel is super tough yet readily weldable. It has a minimum yield strength of 100,000 psi or a minimum hardness of 321 Brinell, if specified. Why not write for more information. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. *USS and "T-1" are registered trademarks*

United States Steel Corporation, Pittsburgh · Columbia-Geneva Steel, San Francisco · National Tube, Pittsburgh · Tennessee Coal & Iron, Fairfield, Alabama · United States Steel Supply, Steel Service Centers · United States Steel Export Company

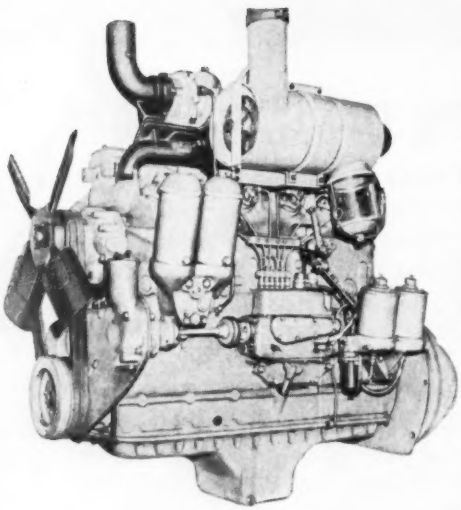
This mark tells you a product is made of modern, dependable Steel.

United States Steel

NEW International® TD-

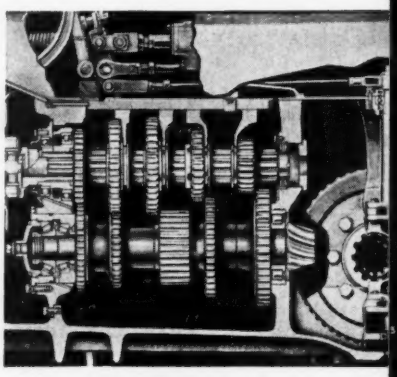
...built to "BEEF UP" your profit edge!

From air intake to new fixed drawbar —from day-to-day dependability through year-in, year-out durability—new strength, new performance protection, new work capacity are built into the new TD-20. Check and compare the advantages of International turbocharged Diesel power, teamed with beefed-to-match new transmission and final drive components—platformed on a far stronger-than-ever undercarriage—turned into new efficiency by International-built tracks, kept in life-prolonging alignment by exclusive International 3-point suspension. See your International Construction Equipment Distributor for a new TD-20 demonstration.



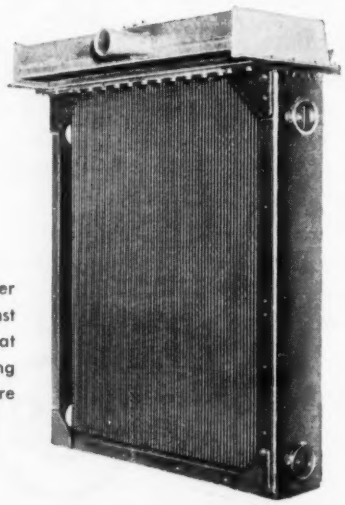
New Turbocharged Diesel Wallop

Modern turbocharging crams air into the new TD-20's smooth running 6-cylinder engine—to produce extra hp efficiently at all altitudes; and to give a 50% torque rise to lug larger overloads. Crankcase ribs are "beefed up;" cooling, air cleaning, and crankshaft capacity all are increased to team with turbocharging. Push-button TD-20 starting is by famous International gasoline-conversion system!



New transmission capacity ...New filtering system added

Heavier shafts, more rugged gears, and roller bearings of greater capacity are provided—to carry increased hp and add thousands of hours to working life of power train components. New transmission oil pump circulates and filters life-guarding lubricant. New "short-travel" levers add operating ease.



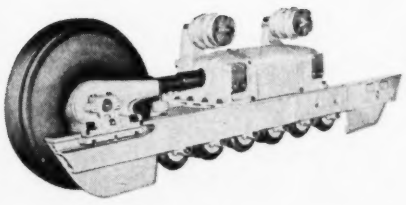
Larger radiator plus jet head increases cooling capacity

Coolant, under pressure from the new greater capacity radiator, is shot through jets against lower surface of TD-20 heads—to aid heat transfer and avoid build-up of heat-trapping deposits. Fan shroud and radiator guard are "heavied" for increased rigidity.

20

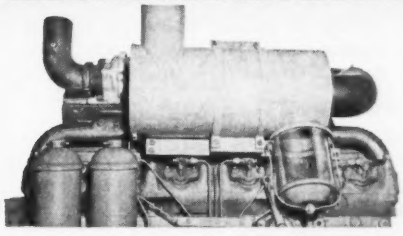
(201 SERIES)

New 140-hp International TD-20 crawler tractor. Develops 113 drawbar hp. Powered by 6-cylinder DT-691 Turbocharged Diesel engine. New capacity 6-speed, full-reverse transmission is controlled by new short-travel gear-shift and Shuttle-Bar levers.



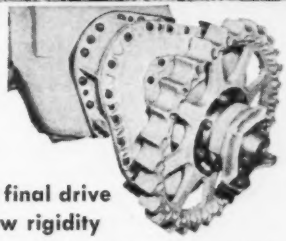
New Undercarriage Strength and Protection

New drum-type front idlers add strength... International also adds track chain guides to both sides of the TD-20's precision-welded double box-beam track frames! New track roller shields are of cast steel. New heavier strutless track links are self-cleaning and power-saving. The new hydraulic track adjuster, with built-in safety relief is "standard" on the new TD-20. And full-floating seals of increased efficiency guard Dura-Roller life!



New 99.8% efficient Dry-Type air cleaner

For positive "breathing" safety, the full air volume taken in by turbocharging is "dry-cleaned" of 99.8% of its dirt—by the TD-20 Diesel's new dry-type air cleaner. Handy, under-hood horizontal mounting—and transparent, quick-dump collector—greatly simplify servicing. Dash indicator shows "red" when cleaner element needs washing.



New final drive ...new rigidity

New TD-20 final drives have been strengthened to deliver full torque turbocharged power to the tracks. New sprocket drive doweling increases housing rigidity—helps maintain precision component alignment. Other major steps ahead in TD-20 design include: new torque-taking, life-adding bimetallic steering clutch discs; new pivot shaft inner spacer; new hardness of sprocket drive pinion shaft.

International®
Construction
Equipment

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

People in Coal *(Continued)*

First Aid & Mine Rescue Contest, he was also a member of the general technical advisory committee of the Office of Coal Research. Friends were invited to make memorial contributions to the Ralph Spindler Scholarship Fund, office of the West Virginia University Development Program.

Harry W. Findley, 66, passed away suddenly at his home in Mt. Lebanon, Pa., on Feb. 11. Mr. Findley was engaged in several business enterprises, among them the West Freedom Mining Co., a coal stripping operation.

Robert D. Cowen, president, M&O Coal Co., was killed March 9 when a company plane made a crash landing in bad weather 2 mi west of Allentown, Pa. Mr. Cowen began his career with North American Coal Corp. in 1928 and remained in the coal business the rest of his life, founding the M&O Coal Co. in 1942.

Rodger D. Holt, president of Meador, Young & Holt Coal Co., died Feb. 11 of a cerebral hemorrhage. In spite of poor health for the past 11 yr, he maintained an active business schedule as head of the company until a few days before his death. He entered the coal industry as a stenographer with Consolidated Coal Co. and in 1917 located in Clay, Ky., as manager of Clifty Coal Co. Mr. Holt became president of the newly formed company of Meador, Young & Holt in 1929.

James C. Johnston, product control engineer, Eastern Gas & Fuel Associates, died on Feb. 12. Upon his graduation from Ohio State University 37 yr ago, Mr. Johnston started to work with predecessor companies of Eastern and continued in various capacities, traveling in Kentucky, Pennsylvania and West Virginia while maintaining his home in Lancaster, Ky.

John J. Zimmerman, superintendent of Woodward Colliery, Glen Alden Corp., succumbed March 9 after being stricken with a heart seizure at work. Employed by Glen Alden many years, Mr. Zimmerman had served as assistant superintendent and then superintendent of Huber Colliery.

Equipment Approvals

Jeffrey Mfg. Co.—Type MM-100L miner with 94-D/L conveyor; three motors, one 50-hp and two 2-hp, 440-V, AC. Approval 2F-1614A, Feb. 2.

Joy Mfg. Co.—Type 10SC12PHY/-PXHY-10 shuttle cars; five motors, three 25-hp and two-15-/7.5 hp, 380-V, AC. Approval 2F-1615A, Feb. 3.

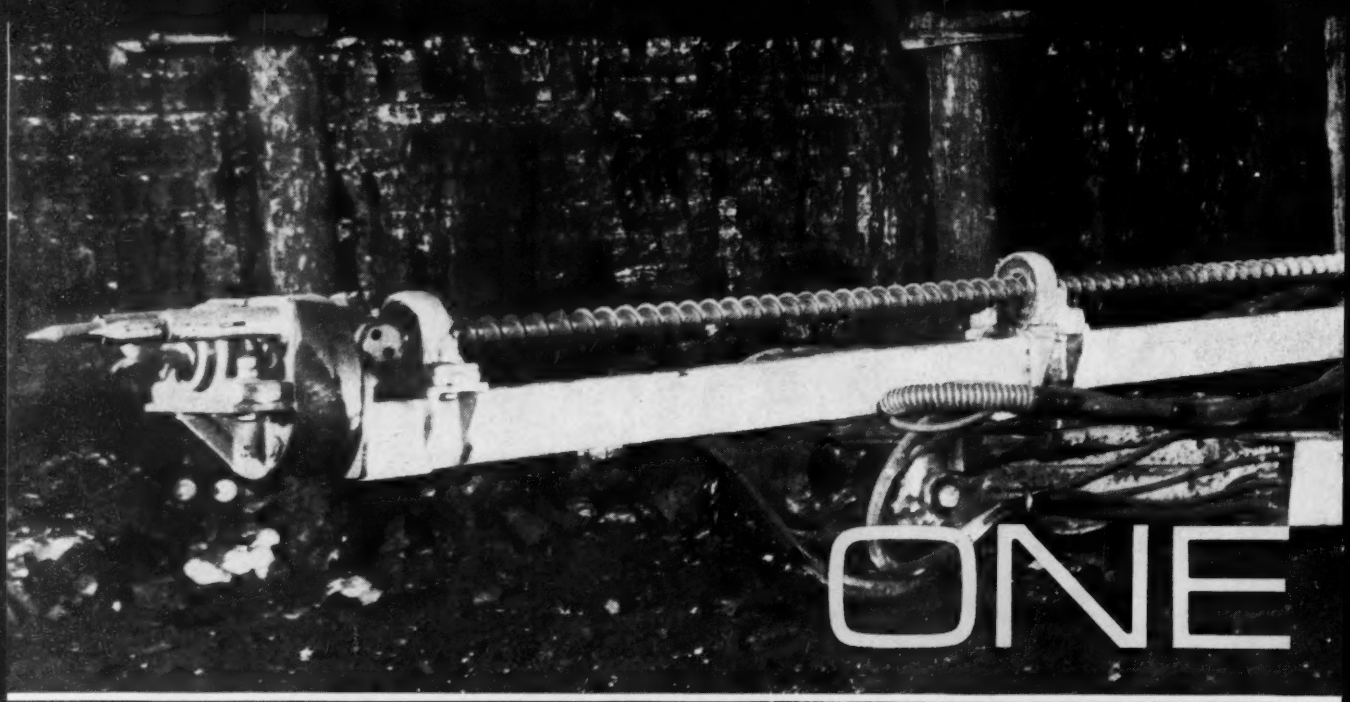
Megator Corp.—Type M16 mining pump; one motor, 1½-hp, 440-V, AC. Approval 2F-1616A, Feb. 8.

Approval 6D-31 covering the Edison Model S cap lamp was transferred from the McGraw-Edison Co. to the Nickel-Alkaline Battery Div., Electric Storage Battery Co., Feb. 9.

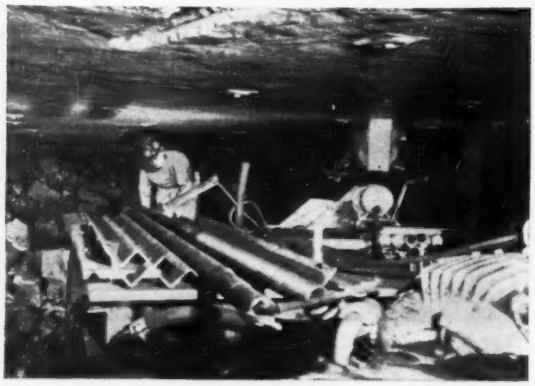
Joy Mfg. Co.—Model 20RC3-1 twin diesel-powered mechanical shuttle car, powered by two Caterpillar Model D311H diesel engines for use in noncoal mines. Approval 24-37, Feb. 9.

Mine Safety Appliances Co.—No. 85121 miniature methane-indicating detector. Approval 8C-15, Feb. 17.

Acme Machinery Co. — Model SPHRD-1C rotary roof drill with integral dust-collecting system; one motor, 25-hp, 440-V, AC. Approvals 2F-1617A and 25B-80, Feb. 28.



Single unit drilling-shooting machine offers



This is a "standard" cycle established in a West Virginia coal mine:

Tramming (200 feet average)	2.00 minutes
Drilling	4.10 minutes
Loading Holes with Airdox Tubes	2.00 minutes
Walk to Blowdown Valve and Return	1.32 minutes
Shooting	1.50 minutes
Removing Tubes From Holes, Loading on Machine	2.00 minutes
Total	12.92 minutes

The Long-Airdox mobile drilling-shooting machine makes it possible for *one man* to drill and shoot the face quickly and economically.

It is equipped with racks for carrying tubes, high

fast cycle for high capacity mining systems

pressure hose, and sequence valves. Operator drills holes, inserts tubes, and shoots them in proper sequence in a single operation.

New Long-Airdox developments—the mobile coal drilling-shooting machine, lighter weight automatic discharge tubes, sequence shooting of any number of holes, and others—force revision of former ideas concerning air shooting. Long-Airdox Mobile Multiple Shooting also gives you these plus benefits.

- Faster cycles—no waiting for smoke to clear.
- Better loadability—coal is heaved outward for easier, faster loading.
- Full undercut depth realized—square faces and ribs—more coal per cut.
- Especially suited to deeper cuts.
- Low cost—based on clean coal only.
- Better sizing for higher realization and less expensive cleaning.
- Coal has firmer structure—better size stability on the way to market.
- Safety.

For complete details on Mobile Multiple Shooting, and for information on drilling machines for all applications, write Long-Airdox, Oak Hill, West Virginia.

LONG-AIRDOX

The talk of the mining industry—"West

Provides Superior Anchorage at a Remarkably Low Price - $.20 each

Connors announces a new development in mine roof support — the LOKGRIP Expansion Unit. Tested in a number of mines, the new unit offers these advantages:

- LOKGRIP eliminates radial expansion thrust against threads.
- LOKGRIP provides superior anchorage characteristics at low cost.
- LOKGRIP utilizes two-piece expansion unit which does not require a retaining ring.
- LOKGRIP shell is formed from shell casing quality steel with a minimum tensile strength of 70,000 lbs. per square inch.
- LOKGRIP plug is a precision malleable iron casting with a minimum strength of 50,000 lbs. per square inch.
- LOKGRIP unit is self locking — requires no palnut — cuts installation time.
- Tested by the U. S. Bureau of Mines.

Virginia's "new LOKGRIP* Unit

*Patent Pending

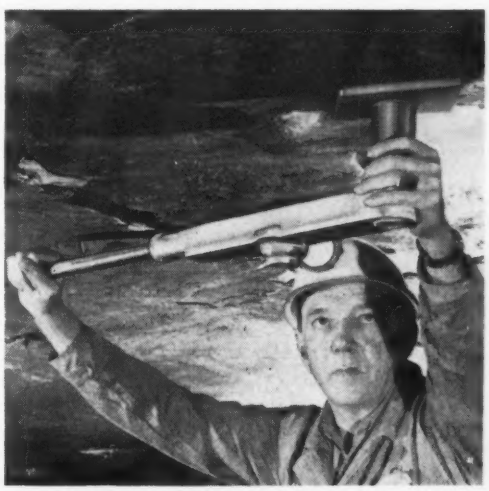
Working closely with Mine Inspectors, "West Virginia's" research and development staff has developed and placed on the market, the new LOKGRIP Expansion Unit.

Extensive tests with other units in seams such as Cary, Cedar Grove, Indiana No. 3, Leatherwood, and Pittsburgh proved LOKGRIP'S superior anchorage capabilities under varying roof conditions.

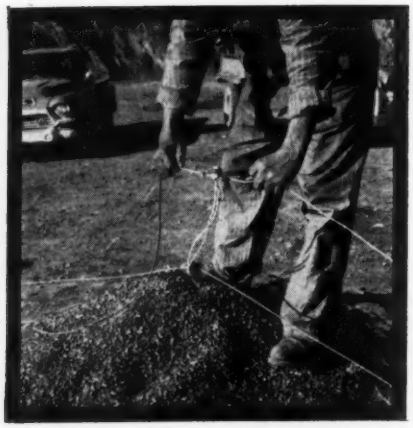
LOKGRIP may apply to your specific roof control problem. In many cases, properly installed in 1⅜ inch diameter holes. LOKGRIP'S anchorage has been amazingly effective resulting in reduced costs with a high safety factor. For further information or demonstration, write or call **WEST VIRGINIA WORKS • P. O. Box 118**
Huntington, West Virginia • Phone JAckson 9-7171

PORTER ***CONNORS STEEL DIVISION***
H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.



Pull Tests Prove LOKGRIP'S Anchorage Capabilities. Extensive tests, conducted in various seams, determined the holding power of "West Virginia's" new LOKGRIP– unit's anchorage rated equal to or better than competitive priced units. (many costing more).



Primacord®

provides maximum safety and dependability when using cap-sensitive explosives

Primacord Detonating Fuse provides a continuous line of detonation of sufficient strength to initiate any cap-sensitive explosive with which it comes in contact. A Primacord downline in your hole will result in full-column detonation, because it initiates every cartridge in the hole. Deck loading is simplified. The hazard of unexploded powder in the muck resulting from bridged cartridges or other causes of load separation is minimized.

Primacord is less sensitive than the explosive itself. It detonates at a speed of almost four miles per second along its entire length. It cannot be set off by sparks or stray electrical currents – or by normal vibration, friction and shock. It is simple, easy and economical to use.

The Primacord downline can be attached to the trunkline by simple knot connections. The shot can be fired instantaneously – or holes can be delayed by surface techniques using Primacord M/S Connectors.

These advantages make Primacord the ideal initiator for a wide range of blasting applications both underground and open pit. It is available in a number of standard and special types developed to meet varying needs. For further information, consult your explosives manufacturer or write

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut • *Since 1836*
THERE IS A TYPE OF PRIMACORD® FOR EVERY TYPE OF BLASTING

Free! NEW GUIDE AND CONDENSED MANUAL: "PRIMACORD DETONATING FUSE...WHAT IT IS... HOW TO USE IT." ASK YOUR EXPLOSIVES MANUFACTURER OR WRITE US GIVING YOUR COMPANY NAME.

1911 • FIFTY YEARS OF SERVICE TO COAL MINING • 1961

Devoted to the Operating, Technical and Business Problems of
The Coal-Mining Industry

COAL AGE

APRIL, 1961

IVAN A. GIVEN, EDITOR

Simple Justice

Will wonders never cease? The answer to this question has to be "yes" when a natural-gas distributor charges coal companies and coal-carrying railroads with "dumping" coal. This charge was made Feb. 28 at the Interfuels Session of the annual meeting of the AIME, at St. Louis.

Maybe this switch is further evidence that coal is making headway. Certainly the repetition, at the Interfuels Session, of the old gas-industry charge that coal's aim in asking for a study of the desirability of a National Fuels Policy is the "un-American" one of allocation of markets, seemed a little more frantic than usual. One reason may be that pipeliners and distributors realize the weakness inherent in attacking the idea of a national policy covering all fuels while benefiting from a "National Natural Gas Policy" aimed at holding down or cutting wellhead gas prices and thus beefing up the competitive power of gas in the market place.

This natural-gas policy is a fact. And the results are not inconsequential. Every 1c-per-thousand cut in wellhead prices by government fiat gives gas a 25c-per-ton competitive advantage. Thus, while coal comes into the market arena barehanded, gas comes in with a set of government-forged brass knuckles. Yet gas continues to prate about free economic choice by consumers. In reality it benefits from an outstanding example of interference with the free play of economic forces.

Now it charges dumping of coal, inferring that rail freight reductions and low mine costs are somehow reprehensible. Actually, in the area served by the distributor who made the charge at St. Louis, two new mines have been opened by utilities and an existing one greatly expanded, the extra coal replacing gas. This effectively explodes the dumping charge but it might also be observed that the freight reductions are voluntary and not imposed by the government to help coal, while the low mine prices are the result of hard work and heavy investments to cut coal cost and raise coal quality.

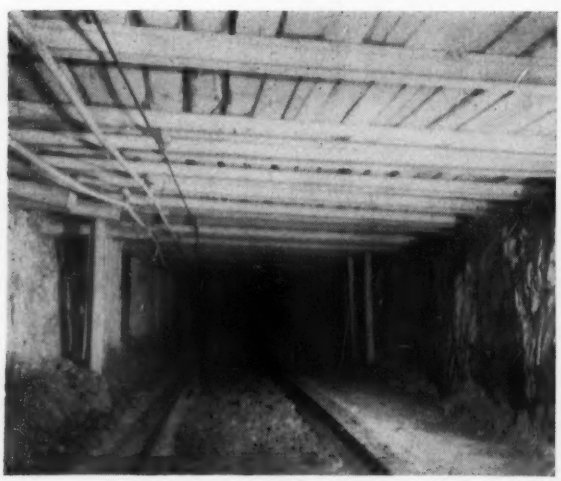
Coal has no federal agencies standing behind it to hold down the price of labor, of equipment, of materials, and of coal in the ground. It buys in the open market and pays the going rate arrived at by the free play of economic forces. Its efforts and its expenditures have most certainly earned it the right to attempt to compete for its rightful share of the energy market free of artificial handicaps. And when it suffers under such a handicap, its record, as well as simple justice, entitles it to ask for at least a study of the situation and its meaning to the Nation, as well as to the energy industries involved.

BORING-TYPE MINER cuts arched opening which adds greatly to roof strength at O'Donnell No. 1. Other benefits include greater productivity and increased coal recovery. The mine now has five continuous miners.

Continuous Mining Boosts Productivity And Safety at O'Donnell No. 1

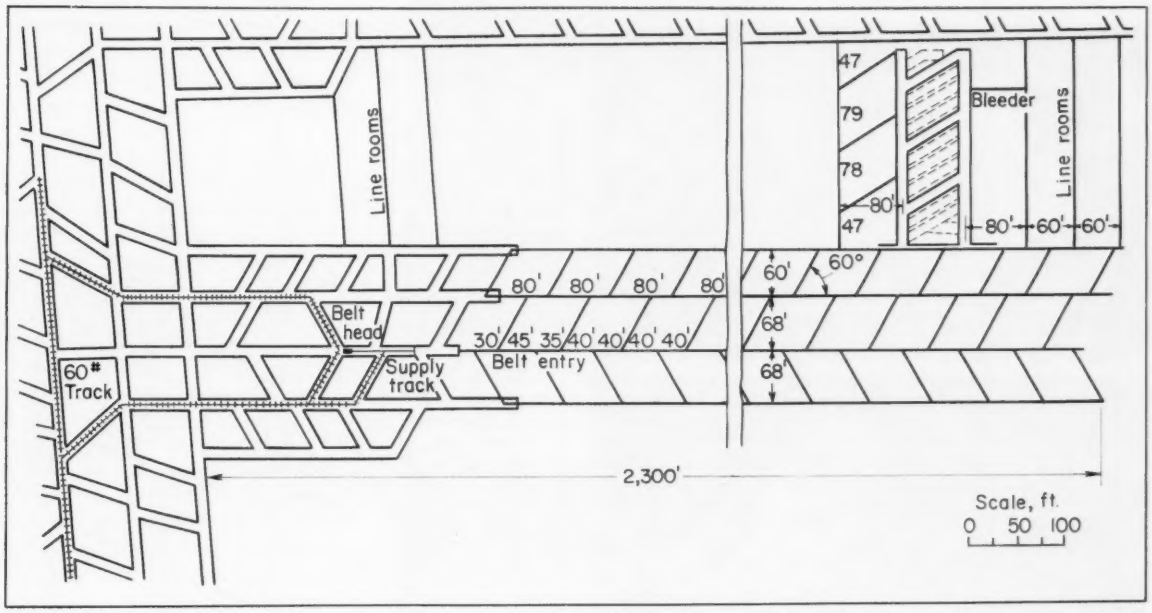
A BOOST in productivity, a safer mine, better coal recovery and simplified ventilation are four important reasons why management is enthused about continuous mining at Rochester & Pittsburgh Coal Co.'s O'Donnell No. 1 mine, Four States, W. Va.

As a result of converting to full continuous mining in the past 2 yr R. & P. management notes a vast improvement in roof conditions at the face and in headings which are serving as haulage roads and aircourses. Better roof conditions at the face contribute heavily to greater productivity because a single line of roof bolts on 4-ft centers provides sufficient support in the arched openings. Before switching to continuous mining, the friable roof required two 5x7-ft by 14-ft crossbars or six 7-ft roof bolts per cut.

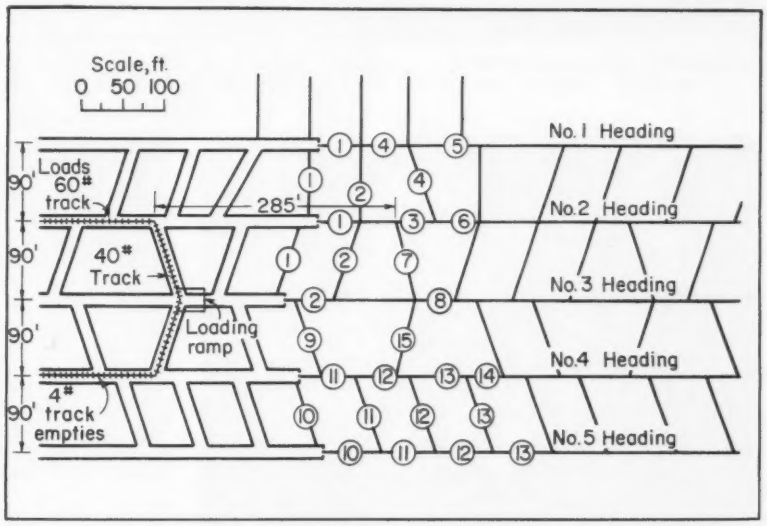


BEFORE continuous miners went into service, roof frequently was supported by rails hitched in ribs and lagging.

TODAY haulage roads are free of obstructions. Single row of 7-ft roof bolts in center of heading supports roof.



ROOM-ENTRY PLAN for boring-type continuous miner includes four headings with breakthroughs on 60-deg angle and belt haulage. Rooms on 80-ft centers are driven on retreat. Pillar is recovered as soon as room is completed.



DEVELOPMENT PLAN for five-heading flat entry features loop haulage. Loops are advanced every 285 ft. Mining sequence is shown by circled numbers.

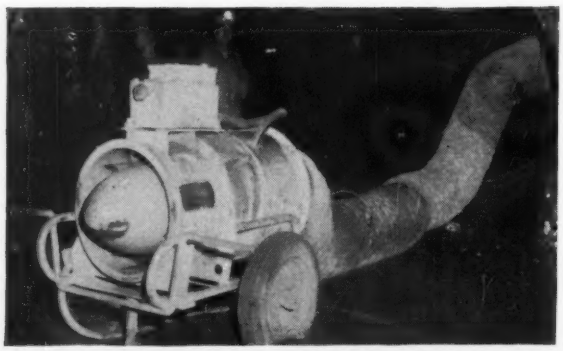
And in some instances, the company hitched two 60-lb rails into the ribs to supplement roof bolts. Continuous miners also enable the company to recover chain and barrier pillars which could not be mined with conventional equipment.

Installing roof support in the conventional mining setup not only slowed the production cycle but also required more manpower. Furthermore, to keep aircourses open, the company set two rows of creosoted posts on 4-ft centers in the openings. These treated timbers no longer are needed because the bolts set on the advance in the arched openings cut by boring-type continuous miners provide sufficient support. As a result, the company now gets aircourses and escapeways which are free of obstructions and require little or no maintenance. Ventilation problems are minimized in the newly developed areas because the openings are free of roof falls and obstructions.

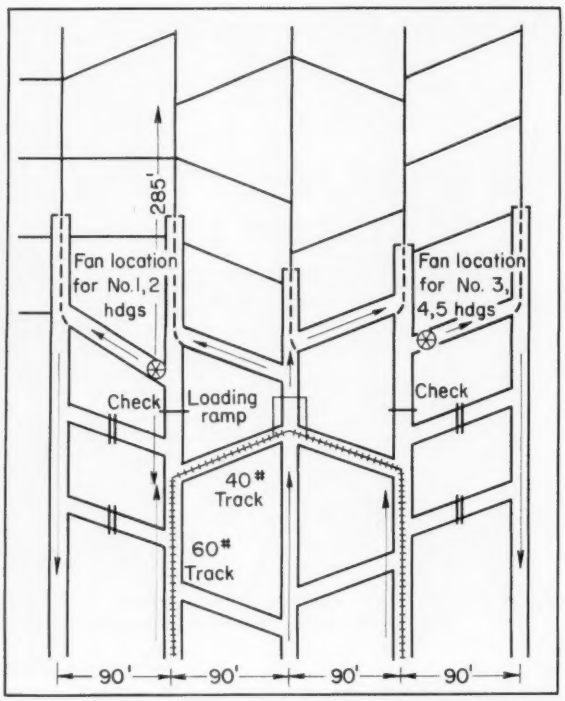
O'Donnell No. 1 has five continuous miners operating a total of 11 shifts in 24 hr. They include two Goodman and two Joy boring-type machines and a Joy ripper unit. Four of these machines produce coal on the day and afternoon shifts and three operate on the third shift. Thus each machine remains idle at least one shift each day, during which time it receives regular maintenance. The idle miner also is available as a spare if one of the others should have a serious breakdown. The boring miners work in entry development and rooms. The ripper unit works only in chain and barrier pillars.

Mining is in the Pittsburgh seam which has a minable thickness of 6 ft in this area. To provide support for the weak roof the company tries to leave about 1 ft of top coal in place. The seam has two thin rock partings which are commonly found in the Pittsburgh seam. One band cuts the seam 22 in from the top and the other cuts it at 18 in. These partings pose no problem for the continuous miners but bands and balls of sulphur are a big problem. They may appear anywhere in the seam and may be as much as 8 in thick.

Clay veins also frequently cut through the coal and often must be drilled, shot and loaded to avoid abuse of the continuous miners. Because of these two impurities, management reports that bit cost is higher than average. (*Continued*)



AUXILIARY FAN, mounted on wheels, supplies 6,000 cfm of air to face. Tubing is reinforced with steel loops.



VENTILATION PLAN includes auxiliary fan and flexible tubing which provides a fast-moving current of air at face.

SHUTTLE CAR discharges onto belt conveyor in room panel. Belt length reaches 2,200 ft in average room entry.

SUPERVISORS include C. A. Ash (seated, left), mine foreman; H. T. Vinton, superintendent; Victor Parks, preparation engineer; and P. A. Gottardi, R. & P. assistant production manager; Ivan Weaver, (standing, left), chief clerk; George Kincaid Jr., maintenance foreman; and E. D. Wells, resident engineer.

Developing Main Entries

Main-entry development crews are made up of nine men classified as follows: 1 continuous-miner operator, 1 pick up loader operator, 2 shuttle-car operators, 1 utility man, 2 roof-bolters, 1 mechanic and 1 foreman. These men advance an average of 140 to 150 ft of heading per shift, including delays resulting from clay veins or sulphur bands.

The mining plan calls for developing five headings 11 ft 8 in wide on 90-ft centers with the boring-type continuous miners. Other section equipment includes a Joy 11-BU loader, two 10-SC shuttle cars and a company-designed roofbolter.

To keep unproductive moves of the continuous miner to a minimum, company engineers have carefully planned the sequence of developing the openings. For instance, a continuous miner sometimes advances as much as 235 ft before it must tram to a new starting position. Management emphasizes that in making these long advances the continuous miner intersects previously driven openings to establish ventilation circuits in compliance with mining laws. Details of this main-entry development plan are shown in the accompanying illustrations.

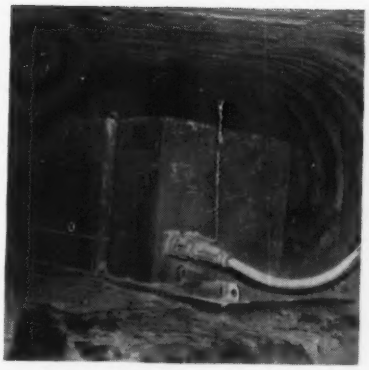
In flat headings shuttle cars travel different routes. They carry coal to a loading ramp in the middle heading and discharge it into 6-ton ACF steel mine cars. These cars travel on a track loop extending between No. 2

and 4 headings and are pulled by the loading ramp by a Brown-Fayro hoist. The empty track and connecting loop are laid with 40-lb rail and the loaded track with 60-lb rail. Track loops are advanced every 285 ft.

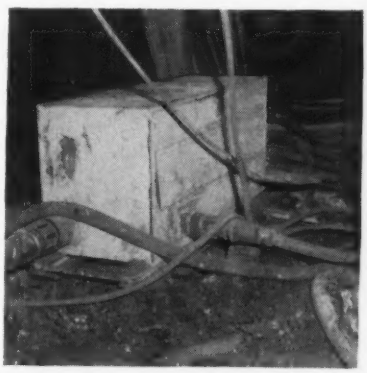
To provide adequate clearance for the loaded mine cars, the company lifts 18 in of fireclay bottom rock. The continuous miner does this job on the non-producing shift, advancing as much as 120 ft per shift in the rock bottom. Rock is loaded into shuttle cars and gobbed.

Mine management eases the job of moving to a new loading point by advancing the track and wire as the working faces move ahead. Thus, when the continuous miner reaches the projected limit for a particular setup, a new loading point can be established with a minimum of work. In many instances this work involves only connecting the track loop across the No. 3 heading.

O'Donnell No. 1 sometimes uses a Joy 30-in belt conveyor in main-entry development work. Installed in the No. 3 heading, the belt reaches a maximum length of 2,500 ft before it is dismantled and reset at a new loading point. A Stamler hydraulic car spotter pulls the mine cars by the loading point when the belt is used.



LOAD CENTER reduces 4,160-V AC power to 480 for operating continuous miner. Each section has unit like this.



DISTRIBUTION CENTER, 1,000 ft from the load center, has outlets for the continuous miner and other AC equipment.

Developing Room Entries

In developing room entries O'Donnell No. 1 drives four headings on 60-ft centers, with breakthroughs on 70-ft centers. The entries are driven an average depth of 2,200 ft and a Joy 30-in belt conveyor is extended in No. 3 heading as mining progresses. After the entry reaches the projected limit, three line rooms on 60-ft centers are cut through to the previously driven entry to establish a bleeder.

The first pair of regular rooms on 80-ft centers then are driven to establish ventilation and to make a connection to the line rooms. To provide a solid block of coal which protects the line rooms, the first regular room is started 80 ft outby the first line room. A bleeder breakthrough is cut from the first regular room to the line room at a distance 200 ft from the mouth of the room. Three breakthroughs angled at 60 deg are cut between regular rooms. Rooms do not cut through to the next entry.

In recovering room pillars, the continuous miner takes three lifts per pillar, leaving a 5-ft fender of solid coal on the gob side for protection. Once the initial pair of rooms is driven and the pillar between them extracted, rooms are driven one at a time and the pillar extracted immediately. Chain pillars, which could not be recovered with conventional equipment, are now mined as easily as room pillars. Details of room-panel development and pillar extraction are shown on an accompanying map.

A typical 8-man room-entry crew includes the following men: 1 continuous-miner operator, 1 pickup-loader operator, 2 shuttle-car drivers, 1 utility man, 1 boom man, 1 mechanic and 1 foreman. In developing the panel headings this crew advances an average of 170 ft of heading per shift. In rooms and pillars, the crew advances 200 ft of opening per shift.

Ventilation

To provide a fast-moving current of fresh air across the faces in entry development, the company employs a Jeffrey wheel-mounted 18-in auxiliary fan and flexible tubing. In a five-heading entry, the three middle headings serve as intakes and the two outside ones as returns. When the continuous miner works in Headings 1 or 2, the fan is located in the breakthrough between them. When the miner works in Nos. 3, 4 or 5 the fan is located in the breakthrough between Nos. 4 and 5. The ventilation plan is shown in an accompanying sketch.

Roof Support

Since it takes only 1 min to set a 7-ft bolt, management notes that roof bolting easily keeps up with the continuous miner. Only one 7-ft bolt is required in the center of the narrow arched opening cut by the boring-type miner.

In room work the arched coal roof usually is strong enough to remain secure without roof bolts. Hence bolts are installed only at four-way intersections or when the seam height decreases until little or no roof coal can be left by the continuous miner.

Powering the Mine

O'Donnell No. 1 has three AC and one DC boring-type continuous miners and a DC ripper unit. All other face equipment is powered by 250 V DC.

Primary AC power is delivered to the mine at 4,160 V by cables suspended in two boreholes. In the mine the 4,160-V cable is either buried or suspended from the roof. It is made up of 1,000-ft sections of General Electric cable joined with high-voltage couplers.

Each AC section has its own General Electric load center and switch gear where the 4,160 V power is reduced to 480 for operating the continuous miner. This load center feeds AC power to the miner through 1,500 ft of cable, made up of a 1,000-ft section of 250,000-cir mil conductor and a 500-ft length of 4/0. An Ensign distribution center between the two 480-V sections of cable has outlets for additional AC equipment which might be added in the future.

To provide 250-V DC power to haulage and face equipment, the mine relies on m-g sets and rectifiers. On the positive side of the circuit the company uses a combination of 1-million-cir mil feeder and 9-section trolley wire. A 1-million-cir mil return

feeder is used in all butt entries and bonded track serves as the return in main entries.

Maintenance

Periodic inspections and scheduled unit-assembly replacement provide the foundation for a successful maintenance program at O'Donnell No. 1. By following this program, O'Donnell No. 1 holds maintenance delays to 3% of shift time. Individual logs for each machine provide the basis for setting up the unit replacement schedule.

The five continuous miners produce on a total of 11 shifts in 24 hr. Four produce on the day shift, four on the afternoon shift and three on the third shift. This operating schedule leaves at least one section idle on each shift so that regular scheduled maintenance work can be done.

The company does not keep a mechanic on each section during the production shifts but sends maintenance personnel in on the idle, or non-production, shift. Although these men do not report on the producing shifts they are considered part of the section crew and their time is charged to the section. These underground mechanics follow the maintenance schedule, making regular unit assembly replacements and also thoroughly inspecting face equipment to detect weaknesses that could cause a breakdown.

Even though breakdowns are minimized, the company has a plan of action in case one comes. If a minor breakdown occurs on shift, a shop mechanic rushes to the section to make repairs. But if a major breakdown should occur, the section crew moves to a spare section for the remainder of the shift. Thus production losses are minimized.

The company has five men working in the shop on each of the three shifts. These men rebuild unit assemblies, rewire panelboards, and repair motors and hydraulic components. They handle all major rebuilding of equipment, which also is carried out on a planned basis.

Preparation and Marketing

Before moving to markets along the eastern seaboard, coal is washed, crushed and sized in the 5,000-tpd O'Donnell No. 1 preparation plant. Raw coal is split into plus 5-in, 5x⅝ and ⅝x0 fractions, which follow separate routes through the plant. The plus 5-in is either hand-picked and loaded as a block product or crushed and delivered to a two-compartment Jeffrey jig. The clean jig product then flows to dewatering and sizing screens. The jig also washes the 5x⅝ raw coal.

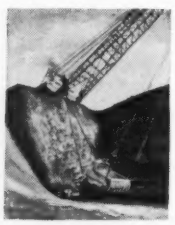
The raw ⅝x0 is split into ⅝x$\frac{3}{16}$ and $\frac{3}{16}$x0 fractions which are cleaned on Roberts & Schaefer air tables. After combining, the clean products flow to one of the five loading tracks as ⅝x0 slack.

Although the plant makes five basic sizes, facilities are available to provide special blends to meet customer requirements. There are seven loading points on five loading tracks and coal passing to any one of the loading points may be oil-treated. The five basic sizes include plus 5-in block, 2x5 egg, 2x1⅛, 1⅛x⅝ and ⅝x0.

Each product from the plant is sampled daily and analyzed to provide management with information on plant performance and coal quality. Daily samples from each mining area also provide information on seam quality.

United Eastern Coal Sales Corp. is exclusive sales agent for Rochester & Pittsburgh's O'Donnell No. 1 coal.

We Saw Them Coming



Those who have been with *Coal Age* a while will recall that it has consistently prophesied that shovels and draglines even bigger than what then appeared to be monsters would be built. The cover this month shows the latest—an 85-cu yd dragline, companion to the 115-cu yd shovel. For the reasons why, the article following this piece is right to the point and worthy of careful study. And there will be even bigger shovels and draglines.

You Win . . . Either Way

Along with a down-to-earth discussion of what continuous miners did for one property, of what the new cyclones can do in washing fines, and of what can be done to get more out of batteries, *Coal Age* this month again offers its exclusive Coal Show service—a preview of the equipment to be shown at Cleveland. It is the only such service available. Its aim is to help you get the most out of your attendance by giving you advance information and thus helping you plan to make your time the most productive. And if you don't make it, here is the exhibit story. The report on the convention proceedings will be a further dividend appearing in June. You win either way.

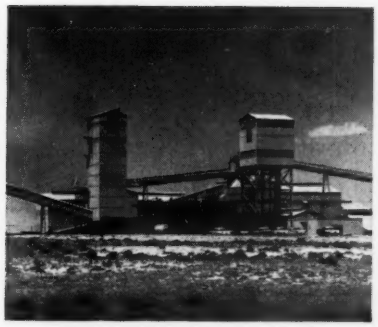
Guidebook in July

Again revised, brought up to date and complete the *Coal Age* Mining Guidebook, exclusive to this publication and a service available no place else, will appear in the July issue. The fundamental principles on which sound practice must be built will be one of the key elements in the 1961 Guidebook. The other, in line with the *Coal Age* concept of service, will be an up-to-date rundown on equipment and methods that have proved their effectiveness in service.

It's the year's biggest bargain—a $10 to $15 handbook for a quarter—to subscribers.

October Landmark . . . Golden Anniversary Issue

This year, in addition to its regular services, *Coal Age* will mark its 50th anniversary of service to coal mining with a unique issue. Features? They include a hard look at what coal markets will be, an equally hard look at how the industry will mine and prepare to serve those markets, and a down-to-earth rundown on what the future will be in all other coal-industry activities. In line with *Coal Age*'s objective of fostering planning for progress, all its findings will be summed up in "A Program for Coal"—a blueprint for progress.



Ropes on Koepe Hoist Handle 2,400,000 Tons in Potash Mine in New Mexico

Serving for 26 months on a Koepe skip hoist at National Potash Company's mine, Carlsbad, New Mexico, Bethlehem Wire Rope handled approximately 2,400,000 tons of corrosive ore. The hoist cables were 1-in. 6 x 27 Form-Set Purple Strand, with fiber core; 1⅜-in. 19 x 19 Form-Set mild plow, non-rotating rope was used for the tail lines.

Economical service is something you can rely on when you specify Bethlehem Wire Rope. Put it to work and you can count on faithful rope performance, shift after shift.

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A 90% power assist on big main drum clutches provides finger-tip control, yet gives the operator positive feel of the load. Engaging speed is automatically controlled to cushion shock and impact loading, protect cable.

Revolving fairlead turns 360° — maintains true cable lead at every pull angle on bucket. Only two sheaves — large diameter — prevents sharp reverse cable bending, provides longer cable life.

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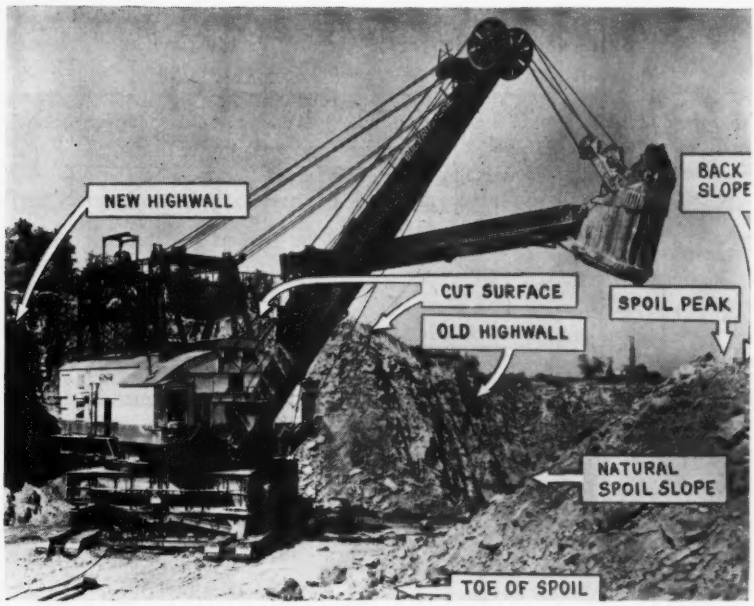

FIG. 1–TYPICAL SHOVEL PIT, showing elements of highwall and spoil.

Weight-Usefulness Relationships For Stripping Machines

Henry Rumfelt
International Division, Bucyrus-Erie Co., So. Milwaukee, Wis.

FIG. 2–TYPICAL DRAGLINE PIT with highwall and spoil elements designated.

Needed—A simple and reasonably accurate method for preliminary appraisal of a stripping operation.

Answer — MUF numbers based on relationship between machine weight and ability to do work.

OVERCASTING, or, in shortened form, casting, is the usual practice in coal stripping. The common machines are the shovel and the dragline, with the wheel, a relative newcomer, being advantageously employed in certain types of overburden.

Casting may be a simple operation involving digging out the material, lifting it from the digging position, moving it over, and dumping it in the spoil position where it remains, for all practical purposes, indefinitely. The mechanics, regardless of the machines used, may be termed "simple casting."

At times, more than one machine may be required. Then the procedure is no longer considered simple casting. Rehandling may be involved, using either another machine or the prime excavator itself. Procedures include the following:

"Extended bench" or "filled pit," employing a dragline operating on a temporary fill from the bench of the cut over to the spoil and involving a certain amount of rehandling by the prime excavator.

"Tandem," with one machine taking part of the cut and a second following unit the remainder.

"Shovel - pullback," involving a prime excavator–a shovel, for example–doing all the digging, and a second machine–usually a walking dragline–rehandling that part of the spoil the shovel cannot put away.

Needed: Quick and Accurate Evaluation Methods

In the past 12 to 15 yr there has been a rapid increase in the size of stripping units. Draglines have almost tripled in size and shovels have

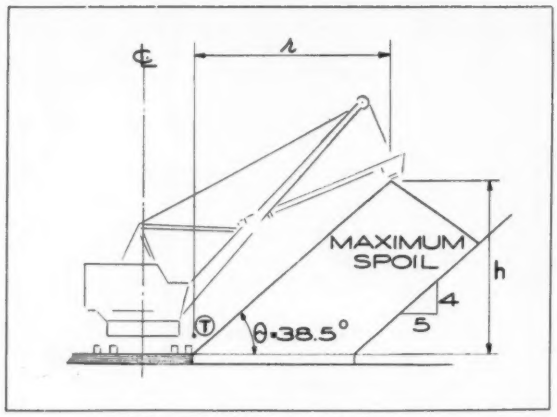

FIG. 3–SHOVEL reach diagram.

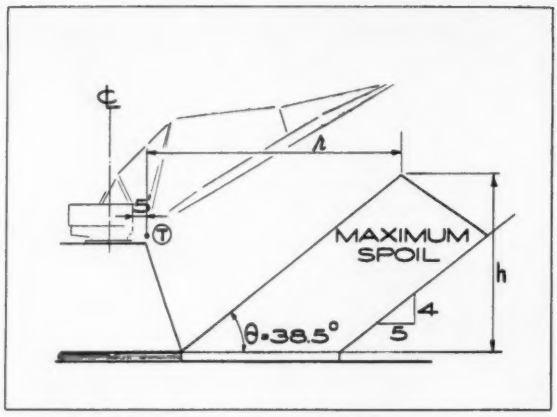

FIG. 5–DRAGLINE reach diagram.

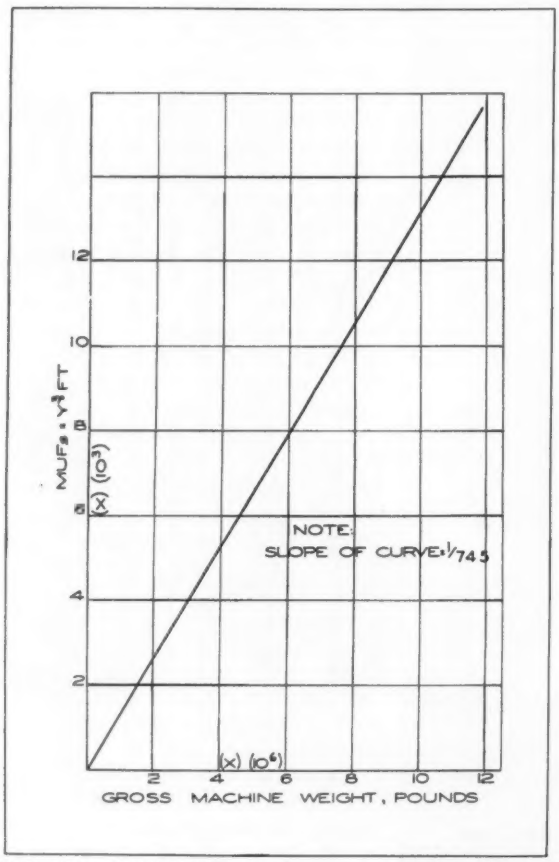

FIG. 4–RELATIONSHIP between gross shovel weights and MUF numbers.

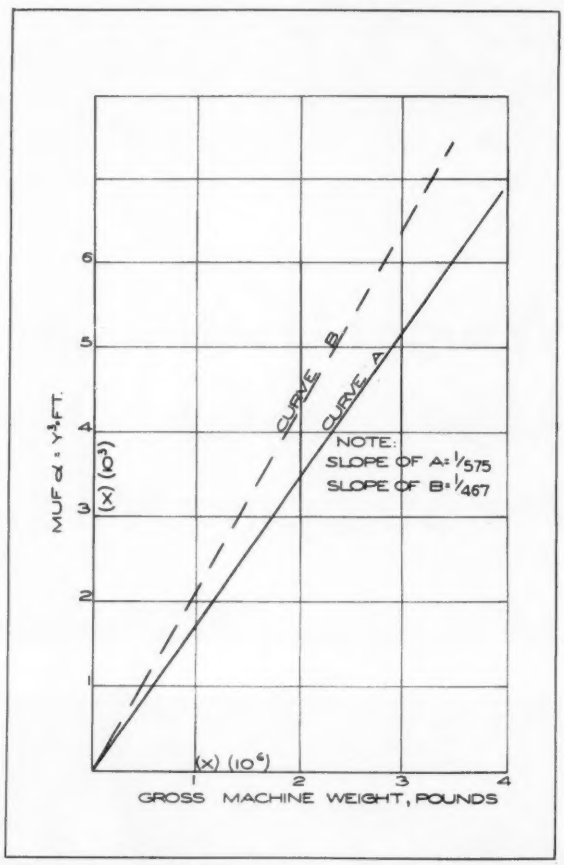

FIG. 6–RELATIONSHIPS between gross dragline weights and MUF numbers.

almost quadrupled. At the same time, as previously noted, the wheel has been accepted as a proven stripping tool. In that same period, the percentage of coal production by stripping has increased significantly. The bituminous percentage was 23.9 in 1950, rising to 29.1% in 1960, according to the U. S. Bureau of Mines.

Another significant development is the increase in depth of overburden considered practicable for stripping. The top limit for overburden 12 to 15 yr ago was 50 to 60 ft. Today, 80 to 100 ft is not infrequently handled.

With these changes there has been a continuing search for procedures to economically treat with the problems of deeper stripping. In nearly every instance where reserves are sufficiently large, the indicated answer has been a single machine big enough to handle the overburden by simple casting.

The only known practicable way to evaluate a proposed stripping venture with a high degree of accuracy is to construct step-by-step studies, including cost estimates. Since this is a long procedure there has been a growing demand for a quick and reasonably accurate method of making appraisals for preliminary evaluations

and orientation. Fortunately, as demand for quick and accurate approximations has grown, operation has produced experience data suggesting possible approaches to the problem.

Approaching the Problem

The objective is a method of obtaining a simple preliminary casting analysis for a stripping project.

The approach to the problem employs indicated trends in the relationship of machine weight to ability to do stripping work.

The ability to do work is established through MUF numbers.

The approach also employs situations where the geometry of each cut and spoil section is assumed to take certain defined relationships for varying overburden depths. Slopes are considered stable, which means that such practical factors as the mechanics of soils are ignored for the sake of convenience.

Simple casting operations with shovels and draglines are illustrated in Figs. 1 and 2. In addition to the terms lettered on the illustrations, pits that follow a straight line are referred to as "straightaway." In the discussion and calculations which follow, it is assumed that all sections pertain to straightaway pits, permitting in turn treating areas relatively as volumes.

Volumes of overburden are expressed in virgin cubic yards. "Swell" resulting from digging and spoiling is expressed in percentages of the original volume. For example, if the original cut volume is V cu yd, and the spoil volume is $1.2V$, then the "swell" is a positive 20%.

The MUF Concept

The clue to the approach to treating with the problems of deep stripping is found in the fact that men of long experience in dirt moving emphasize machine weight when assaying its "value" as an excavator. "Value" has not been precisely defined but the concept is considered important since it is a generally held idea and is supported by observation.

The ability of a shovel or dragline to negotiate cuts in deep overburden is limited, in most instances, by its ability to dispose of the spoil. Arbitrarily, therefore, the value concept of a stripping machine is established as the product of the dipper or bucket size of a shovel or dragline times its functional dumping reach. Thus the dumping reach, along with respective dumping height, are significant. The dumping height, however, becomes less significant with the dragline, which works from the surface of a cut or from a bench slightly below the surface.

The angle of repose of the spoil is a factor that must be considered. It will vary with different mines and materials. However, a slope of 1.25 to 1 is frequently found in practice and can reasonably be used in planning.

SHOVEL OPERATION—Fig. 3 is a diagram of shovel reach. To gain maximum advantage in spoiling, the shovel is placed with its crawlers as close as possible to the toe of the spoil pile. A vertical plane through the toe would contain the point designated as Circle T. The dumping reach, r, is thereby established for each shovel analyzed. The MUF_s for any specific shovel is therefore the nominal dipper size times r. In other words, MUF_s is equal to the load moment about the point designated Circle T in terms of cubic yards times feet.

The relationship between gross machine weight and MUF_s numbers is shown graphically in Fig. 4. All recent published specifications for U. S. manufactured machines available to the writer were analyzed in constructing this curve—and the curve for draglines discussed in the following section. The result is significant in that the shovel curve appears to follow generally a straight line regardless of the manufacture or size of the machine.

According to the curve each MUF_s unit requires 745 lb of gross shovel weight. In determining the curve the data were first plotted on a large-scale work graph. This brought out the fact that the points representing actual working shovels were more faithful to the trend line—less "scatter"—than shovels in the design stage and thus existing only on paper. Consequently, the points for actual shovels were given more "weight" than those for "paper" machines. The curve therefore was not determined by strict use of the method of least squares, as is the practice in certain statistical plotting.

DRAGLINE OPERATION—Fig. 5 is the reach diagram for a dragline. For the type of cut section and the operation visualized, the dumping reach, r, is the controlling factor.

Walking draglines are mounted on circular bases called "tubs." Variations in design result in different ground-to-base bearing pressures. To achieve a standardized basis for comparison, the tub diameters are varied from actual to a hypothetical situation in which pressures are uniformly maintained at 10 psi.

With the hypothetical diameter and a 5-ft safety margin next to the highwall edge, a moment center, Circle T, is established. Measuring from this center to the dumping point provides a moment arm, r, for each dragline considered. A figure of 4,750 lb per yard of nominal bucket size is taken to represent the unit weight of the bucket plus load contents. Thus, nominal capacity in cubic yards is obtained by dividing the specified suspended load for the machine by 4,750.

This resulting bucket capacity, in cubic yards, times the length of the arm, r, in feet, gives the maximum usefulness factor for each dragline. Thus, the MUF_d for each machine is the load moment about Circle T in terms of cubic yards times feet (only electric draglines analyzed).

Relationships between gross dragline weight and MUF_d numbers are shown graphically in Fig. 6. Two curves are shown, each following generally a straight line. Curve A illustrates the trend resulting from analysis of the specifications of dominant manufacturers' models in operation and as with operating shovels, the data conform faithfully with the line.

Curve B represents a more advantageous trend which possibly could become significant for the newer and especially the larger draglines. Curve B is not as well defined as A, and is established more or less on the basis of specifications of newly announced larger and some uprated machines.

The slope of Curve A calculates out to 1 to 575; Curve B, to 1 to 467. This means that 575 lb of gross machine weight are required for each MUF_d with Curve A machines, and 467 lb with B machines.

Pit Section—MUF Relationships

The previous discussion brings to light unexpectedly simple yet at the same time logical relationships be-

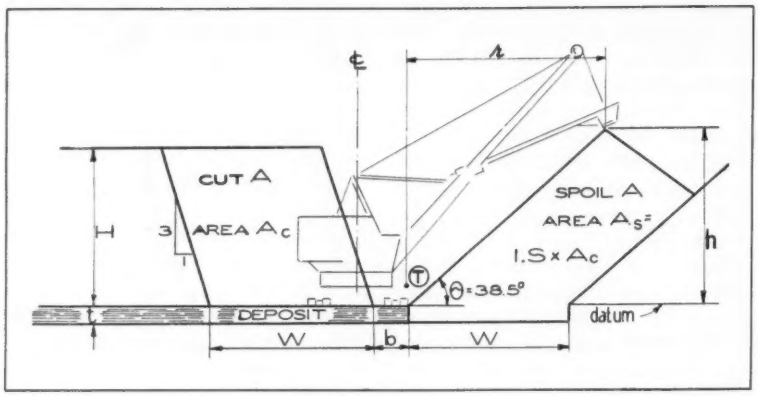

FIG. 7–Shovel section.

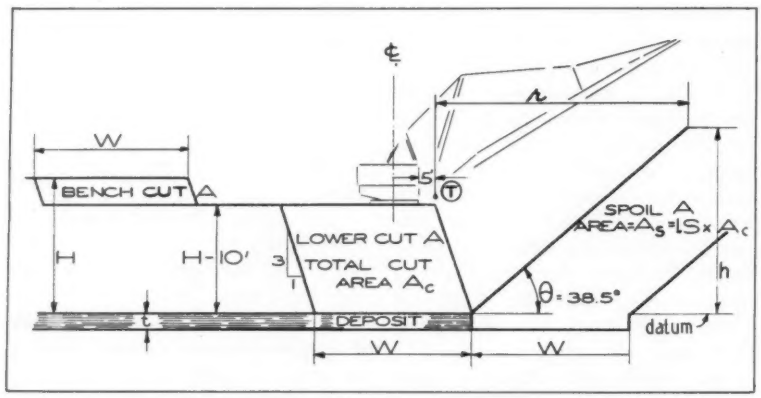

FIG. 8–Dragline section.

tween the usefulness numbers (MUF) and the gross weights of the machines analyzed. To accomplish the previously stated objective it is necessary to demonstrate a relationship between pit-section geometry and the required MUF numbers for varying depths of overburden.

The demonstrations cover both shovel and dragline operations, with the numbers related, in turn, to projected machine gross weights which, in effect, establishes relationships between stripping-machinery mass and overburden volumes (or depths). Therefore, the numbers introduced in this section are the required numbers for the hypothetical sections being studied, whereas the numbers in the preceding section were derived from an analysis of current or recent machines for the purpose of defining trends.

SHOVEL OPERATION–To determine a relationship between the MUF numbers of the required machines for different depths of overburden, hypothetical situations with a number of assumptions are established. Formulas also are derived. One, a generalized formula for r in terms of overburden depth, coal thickness and cut width, is based on the shovel section in Fig. 7.

The spoil angle of repose is 38.5 deg (1.25:1 slope). Berm width, b, does not enter into the computation because it is considered to be sufficiently small that the digging effectiveness of the shovel in its indicated position is not affected. The viewpoint is similar in assuming a highwall slope of 1:3.

The formula for r, in feet, thus becomes:

$$r = [1.25] \times [(1 + S/100)(H) - t + W/5] \quad (A)$$

where,

S = swell in percentage.
H = depth of overburden in feet.
W = cut width in feet.
t = coal thickness in feet.

To deal with varying dipper sizes an "Estimated Shovel Output Table" is constructed. To facilitate computation, selected factors are assumed to be constants. These factors are those that usually can be approximated for a given prospect once the type of machine being analyzed is selected and a general operating approach is determined. For this example, it is assumed that regardless of shovel size the average cycle time will be maintained at 56 sec, the dipper factor will always be 80%, and the monthly operating factor will be kept at 85%. The data in the table show that in line with these assumptions the expected monthly output will be 31,200 D cu yd, where D is the nominal dipper size, also in cubic yards.

Estimated Shovel Output Table

Dipper size, cu yd	D
Dipper factor	80%
Dipper load, cu yd bank measure	0.8D
Cycle time, sec	56
Passes per hr	64
Theoretical hourly output, cu yd bank measure	51D
Scheduled monthly hr of operation	720
Theoretical monthly output, cu yd bank measure	36,800D
Monthly expected operating factor	85%
Expected actual monthly output, cu yd bank measure	31,200D

Nominal dipper size, D, in cubic yards is given by the following formula:

$$D = (Q_e)(1{,}613)(H)/(L)(31{,}200) \quad (B)$$

where,

Q_e = net tons of cleaned coal required per month.
H = overburden depth in feet.
L = yield of cleaned coal per acre in net tons.

The required MUF_s for the shovel at any overburden depth is a product of Equations A and B, giving the following:

$$MUF_s = r.D = \{[1.25] \times [(1 + S/100)(H) - t + W/5]\} \times \{(Q_e)(1{,}613)(H)/(L)(31{,}200)\} \quad (C)$$

DRAGLINE OPERATION – Formulas for r and B are derived in similar fashion for draglines. In obtaining r, it is assumed that the highwall slope remains at 1:3 and that 10 ft of surface will be removed to provide an operating bench. Spoil angle of repose remains at 38.5 deg. The formula for r becomes:

$$r = [0.33H - 3.3] + [1.25] \times [(1 + S/100)(H) - t + W/5] \quad (D)$$

To again deal with varying bucket sizes a dragline table is constructed similar to the shovel table, assuming constants as follows: cycle time, 58

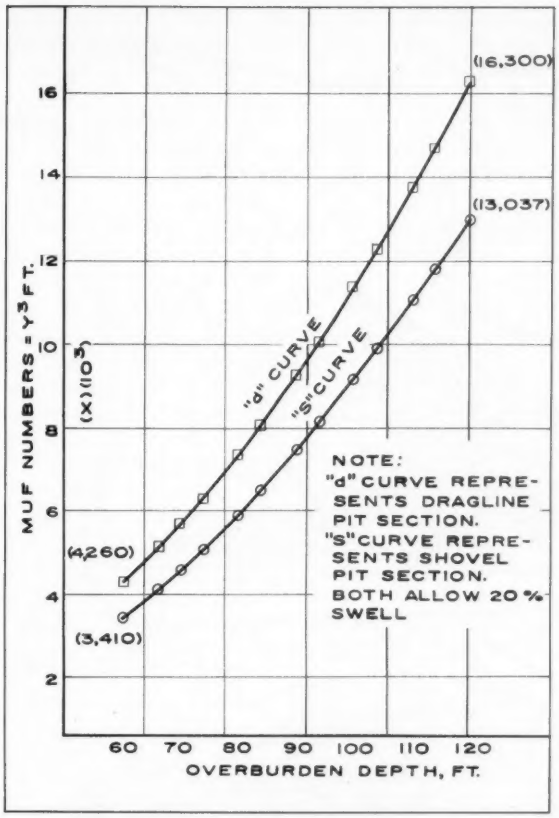

FIG. 9—RELATIVE MUF requirements for simple casting operation with dragline and shovel.

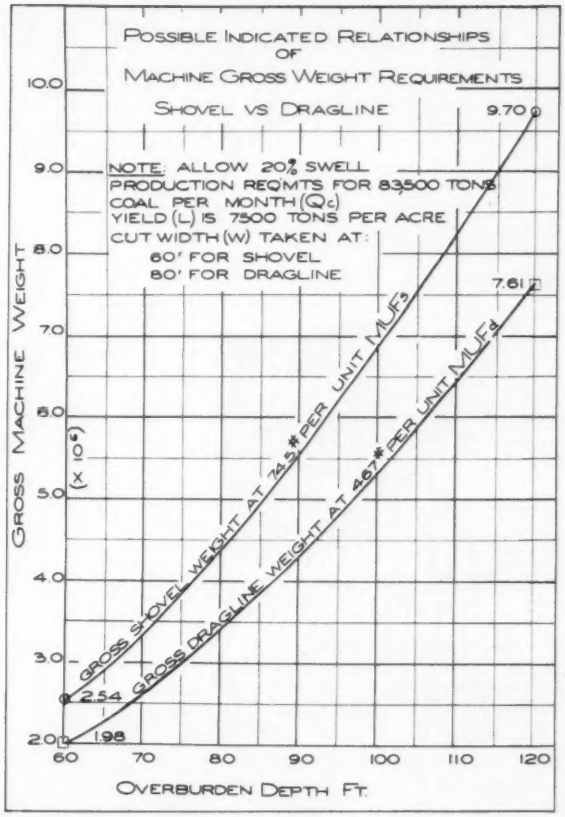

FIG. 10—POSSIBLE INDICATED RELATIONSHIPS in machine gross-weight requirements—shovel vs dragline.

sec; bucket factor, 80%; monthly operating factor, 85%. Expected monthly output will be 30,400*B* cu yd, where *B* is the nominal bucket size, also in cubic yards.

Estimated Dragline Output Table

Bucket size, cu yd	B
Bucket factor	80%
Bucket load, cu yd bank measure	0.8B
Cycle time, sec	58
Passes per hr	62
Theoretical hourly output, cu yd bank measure	49.5B
Scheduled monthly hr of work	720
Theoretical monthly output, cu yd bank measure	35,800B
Monthly expected operating factor	85%
Expected monthly output, cu yd bank measure	30,400B

Nominal bucket size, *B*, is derived from the following formula:

$$B = (Q_e)\,(1{,}613)\,(H)/(L)\,(30{,}400) \qquad (E)$$

The required MUF_d for the dragline at any overburden depth is the product of Equations D and E:

$$MUF_d = r \cdot B = \{[0.33H - 3.33] + [1.25] \times [(1 + S/100)\,(H) - t + W/5]\} \times \{(Q_e)\,(1{,}613)\,(H)/(L)\,(30{,}400)\} \qquad (F)$$

Applying the Findings

An example will demonstrate in part how these findings may be applied. It should be noted, here, however, that the dragline part of the example involves an extrapolation of the prepared data.

Assume a mine prospect compatible with the tables and sections previously presented. Assume also that available information about the property permits establishing as constants certain of the variables. In addition, assume that the natural disposition of coal and overburn are such as to provide the shovel and dragline with approximately equal advantage.

The 5-ft (t) coal is expected to yield 7,500 (L) tons of clean coal per acre. The spoil angle of repose is 38.5 deg from the horizontal. If stripped with a dragline, cut widths (W) would be 80 ft; with a shovel, 60 ft. The average production rate being considered is 83,500 (Q_e) net tons of cleaned coal per month. Overburden depth (H) varies from 60 to 120 ft, and swell is anticipated to be 20%.

Since there are several possible alternatives in connection with the property in question, it is desired to know, prior to more detailed study, the approximate working weight of the dragline or shovel required, in each instance for several overburden depth increments. The weights of each type of machine would be taken into consideration in making the decision on optimal stripping depth. The weights of the machines, of course, are assumed to be related to the investment cost.

After appropriate conversions from variables to constants in the formulas, the digital computer is called upon. The following programming provides significant data on the question:

Program 1—Equation C, which gives MUF_s numbers (a product of Equa-

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tions A and B) for the shovel section is solved for different overburden depths (H) from 60 to 120 ft in convenient increments.

Program 2—Equation F is similarly solved for the dragline section for the same increments of overburden depth.

After the MUF numbers are obtained, each shovel number is multiplied by 745 to give the approximate shovel weight required for the particular depth. Likewise, each dragline number is multiplied by the optimistic figure of 467 to provide comparative weights for this type of machine.

A significant finding is the uniform relationship between the MUF curves for shovels and draglines shown in Fig. 9. The dragline numbers are approximately 1.25 times the shovel usefulness numbers at corresponding overburden depths. On a weight comparison, the dragline would have only a slight advantage over the shovel if the old conservative relationship (Curve A, Fig. 6) was used to determine dragline weight. On the other hand, when the possible new optimistic dragline factor (Curve B, Fig. 6) is employed, the dragline would have a decided weight advantage (see curves in Fig. 10).

Comment and Conclusions

Compilation of the data on design trends was done as accurately as possible. Each of operating shovel models analyzed follows quite faithfully the trend in shovel MUF numbers. For draglines, the MUF_d trend established by analyzing the older models of the dominant manufacturers also is followed quite faithfully by each of the models making up the trend. The MUF trends for both types of machines, however, relate only to mass or gross weight. Other factors in machine size, such as mechanical design and power, are outside the scope of this study.

It may be stated that it is not unreasonable to expect in the future that shovels which are within, or even beyond, the limits of the sizes dealt with would generally conform to the demonstrated MUF trend if built on the basis of the same design criteria. On the other hand, it also seems reasonable to assume that draglines could be built with considerably less weight per unit of value when compared to currently operating machines (Curve A, Fig. 6).

The inferred newer trend, which may approximate, or even surpass, Curve B of Fig. 6, would apply especially to future larger-sized draglines for very deep stripping—100 ft or more. The curves in Fig. 10 show a decided weight advantage for the dragline over the shovel when dragline design follows the new trend.

Assuming that they truly exist, the study demonstrates a procedure that would bring about the "more-valuable" dragline is beyond the scope of this report. Within the possible limitations mentioned, it is felt that the variations in design factors that can be used to approximate the size of machines for simple casting at different depths of overburden under defined sets of conditions. These conditions may be selected arbitrarily, or they may be determined by experience on the particular property or a similar one.

Output tables must be constructed but other than that, it is expected that equations offered herein with simple subsitutions of values will suffice for attaining the stated objective. On the other hand, radical changes in formulas may be required for more unusual problems. A number of possible changes still would permit the development of equations suitable for solution with a digital computer. The angle of spoil repose can be changed, for example, another highwall slope may be assumed, and different output tables may be constructed. All could be included in the new derivations.

The advantages of the digital computer are not necessarily in lengthy and intricate programming, but rather in the facility in handling and the high order of accuracy of results with comparatively simple equations.

It should be emphasized that this study does not take into account the many variables enountered in an actual stripping problem. Derivation of the formulas and the application example required hypothetical situations. Actually, the entire study is based upon situations and trends which are not necessarily fixed. While the trends seem quite clear there is no proof that they are absolute, and they could conceivably change. Therefore, the study should be accepted with the understanding of the existence of this possible limitation.

The 50 Biggest Bituminous Mines

Ranked by 1960 Tonnage

COMPANY	NAME OF MINE	STATE	DIST. NO.	PRODUCTION 1960	1959	1950
1. Clinchfield Coal Corp.	Moss No. 3	Va.	8	4,703,325	3,196,358	New 1958
2. Peabody Coal Co.	Peabody No. 10	Ill.	10	4,117,552	3,764,146	New 1952
3. United States Steel Corp.	Robena (C)	Pa.	2	3,829,046	3,461,579	3,137,832
4. Freeman Coal Mining Corp.	Orient No. 3	Ill.	10	2,936,492	3,111,124	New 1950
5. Consolidation Coal Co., Hanna Coal Co. Div.	Georgetown (S)	Ohio	4	2,631,141	2,648,900	2,247,989
6. Eastern Gas & Fuel Associates	Kopperston Nos. 1 & 2	W. Va.	8	2,624,678	2,416,520	1,463,827
7. Central Ohio Coal Co.	Muskingum (C) (S)	Ohio	4	2,231,827	2,355,855	New 1952
8. Peabody Coal Co.	Ken (S)	Ky. W.	9	2,190,335	2,163,867	672,357 (1)
9. Peabody Coal Co.	Lynnville (S)	Ind.	11	2,175,176	1,144,957	New 1955 (2)
10. Peabody Coal Co.	River King (S)	Ill.	10	2,109,917	1,721,710	New 1957
11. Peabody Coal Co.	River Queen (S)	Ky. W.	9	2,100,073	2,399,157	New 1957
12. United States Steel Corp.	Lynch No. 32 (C)	Ky. E.	8	2,097,933	1,601,945	New 1952
13. Clinchfield Coal Corp.	Moss No. 1	Va.	8	2,027,132	2,714,106	1,333,520
14. Consolidation Coal Co. Pocahontas Fuel Co. Div.	Itmann	W. Va.	7	2,000,402	1,819,182	103,543
15. Old Ben Coal Corp.	Old Ben No. 9	Ill.	10	1,972,640	2,025,470	1,337,249
16. Peabody Coal Co.	Vogue (S)	Ky. W.	9	1,937,370	1,748,039	589,608 (3)
17. Freeman Coal Mining Corp.	Crown	Ill.	10	1,931,657	1,625,192	New 1951
18. Gibraltar Coal Corp.	Gibraltar (S)	Ky. W.	9	1,863,760	1,573,761	New 1955
19. Consolidation Coal Co., Hanna Coal Co. Div.	Ireland	W. Va.	6	1,819,418	1,719,452	New 1956
20. Jones & Laughlin Steel Corp.	Vesta No. 5 (C)	Pa.	2	1,780,807	1,446,947	1,804,556
21. Amherst Coal Co.	McGregor	W. Va.	8	1,734,095	1,598,622	766,326
22. Jones & Laughlin Steel Corp.	Shannopin No. 2 (C)	Pa.	2	1,701,990	1,335,201	835,860
23. Mathies Coal Co.	Mathies	Pa.	2	1,693,812	2,192,214	886,811
24. Consolidation Coal Co. Christopher Coal Co. (Subsidiary)	Humphrey No. 7	W. Va.	3	1,648,652	1,398,570	New 1956
25. Clinchfield Coal Corp.	Moss No. 2	Va.	8	1,639,189	1,738,676	New 1956
26. Duquesne Light Co.	Warwick (C)	Pa.	2	1,623,348	1,583,695	1,044,823
27. Inland Steel Co.	Price (C)	Ky. E.	8	1,597,379	1,309,918	1,223,251
28. Eastern Gas & Fuel Assoc.	Federal No. 1	W. Va.	3	1,595,820	1,689,080	1,613,906
29. West Kentucky Coal Co.	Pleasant View	Ky. W.	9	1,570,855	1,019,695	1,033,409
30. Powhatan Mining Div. North American Coal Corp.	Powhatan No. 1	Ohio	4	1,569,415	1,626,206	1,045,568
31. Nashville Coal Co., Inc.	Uniontown (S)	Ky. W.	9	1,559,804	1,501,727	New 1953 (4)
32. Semet-Solvay Div. Allied Chemical Corp.	Harewood (C)	W. Va.	8	1,532,788	1,695,018	1,451,571
33. Consolidation Coal Co. Hanna Coal Co. Div.	Bradford (S)	Ohio	4	1,524,610	1,499,762	1,128,994
34. Truax-Traer Coal Co.	Red Ember (S)	Ill.	10	1,520,919	1,510,596	1,158,367
35. Olga Coal Co.	Olga	W. Va.	7	1,499,400	1,646,600	960,115
36. Enos Coal Mining Co.	Enos (S)	Ind.	11	1,474,913	1,403,955	1,224,190
37. Eastern Coal Corp.	Stone No. 8	Ky. E.	8	1,455,019	1,161,986	313,422
38. United States Steel Corp.	Gary No. 2 (C)	W. Va.	8	1,454,958	1,388,555	1,352,970
39. Consolidation Coal Co. Christopher Coal Co. (Subsidiary)	Arkwright No. 1	W. Va.	3	1,439,456	1,313,713	908,111
40. Eastern Gas & Fuel Assoc.	Keystone	W. Va.	7	1,424,191	1,249,737	925,700
41. Powhatan Div., North American Coal Corp.	Powhatan No. 3	Ohio	4	1,423,571	1,379,483	1,021,197
42. Truax-Traer Coal Co.	Pinckneyville No. 2 (S)	Ill.	10	1,417,713	1,395,932	New 1951
43. United Electric Coal Co's.	Fidelity No. 11 (S)	Ill.	10	1,408,927	1,146,575	1,859,788
44. Bethlehem Mines Corp.	Idamay No. 44 (C)	W. Va.	3	1,377,189	1,258,224	1,526,110
45. Tennessee Coal & Iron Div. United States Steel Corp.	Concord (C)	Ala.	13	1,371,115	848,011	740,696
46. Youghiogheny & Ohio Coal Co.	Nelms	Ohio	4	1,356,626	1,283,908	784,994
47. Alabama By-Products Corp.	Maxine (C)	Ala.	13	1,350,099	1,531,680	New 1953
48. United States Steel Corp.	Gary No. 14 (C)	W. Va.	7	1,349,751	1,140,907	456,080
49. Freeman Coal Mining Corp.	Freeman No. 4	Ill.	10	1,349,233	1,269,773	New 1952
50. United Electric Coal Co's.	Buckheart No. 17 (S)	Ill.	10	1,336,250	1,273,765	1,130,386
TOTAL PRODUCTION, 50 MINES				94,081,768	87,050,051	38,083,126
U. S. TOTAL PRODUCTION, Bituminous and Lignite				415,000,000 (a)	412,027,502	516,311,000
% LISTED MINES TO NATIONAL TOTAL				22.6	21.1	7.4

SYMBOLS: (C) Captive Mines. (S) Strip Mines. (a) Preliminary. (1) Ken Coal Co. (2) Lynnville Coal Co. (3) Terteling Bros., Inc. (4) Stony Point Coal Co.

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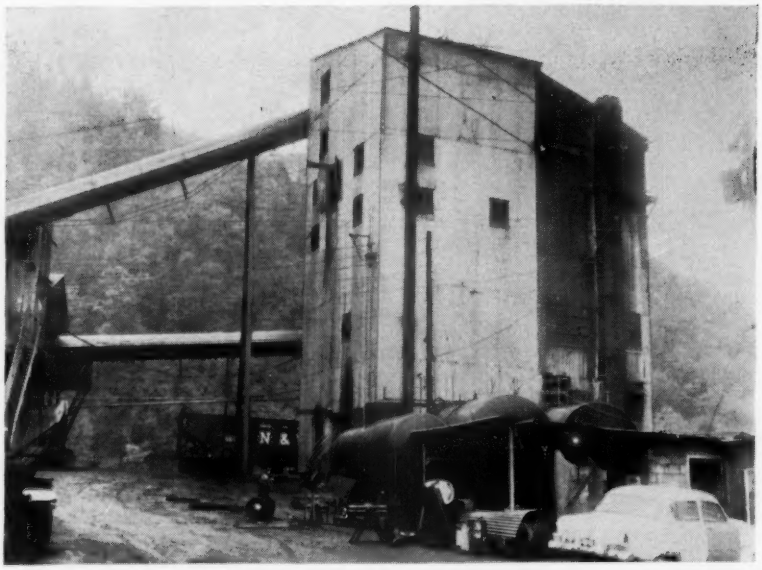
Heavy-medium cyclones with automatic nucleonic density controls yield consistently uniform high-quality 1/8x0 product. Low-cost plant was built fast to solve preparation problem.



NEW FINE-COAL PLANT has two 20-in heavy-medium cyclones with nucleonic density control for precision washing of fines. Framework is joined with bolts.

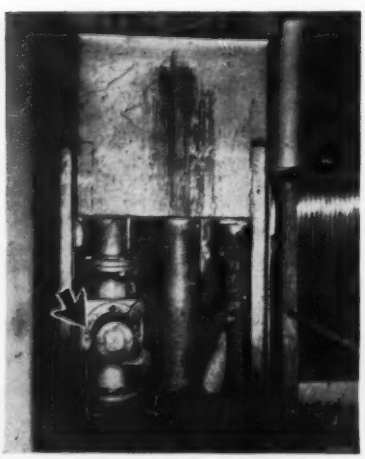
Heavy-Medium Cyclones Wash Fines

PRECISION WASHING of ⅛x0 fines with Dutch States Mines heavy-medium cyclones enables Island Creek Coal Co.'s Bartley No. 1 plant, Bartley, W. Va., to offer a product that meets the rigid standards characterizing today's metallurgical market.

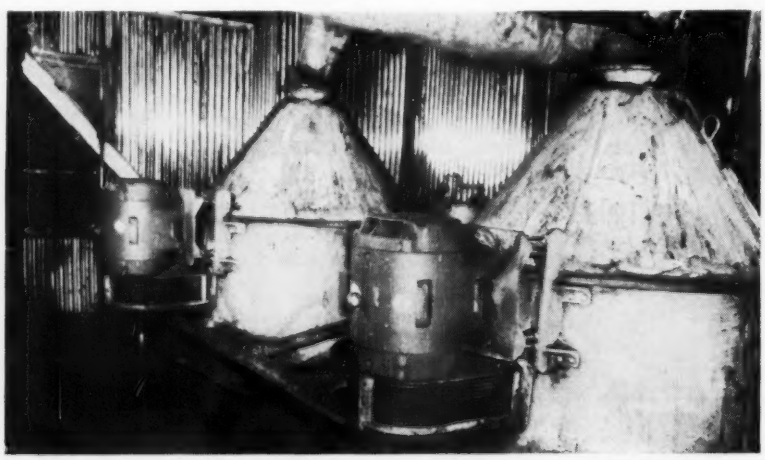
The new heavy-medium-cyclone addition to the plant provided Island Creek with a prompt solution to several pressing problems which arose late in 1958. At that time Bartley No. 1 faced not only the challenge of a tightening metallurgical market but also worsening mining conditions that resulted in more refuse in the raw fine coal.

Before the new heavy-medium cyclone facilities were added, fine coal was cleaned by three air tables. But with the increase in fine refuse the air tables were unable to handle the fine-coal cleaning job. As a consequence, the ash in the clean product increased and there was considerable coal lost in the refuse. The company not only wanted to reduce the ash in the clean coal but also to recover the coal that was being lost.

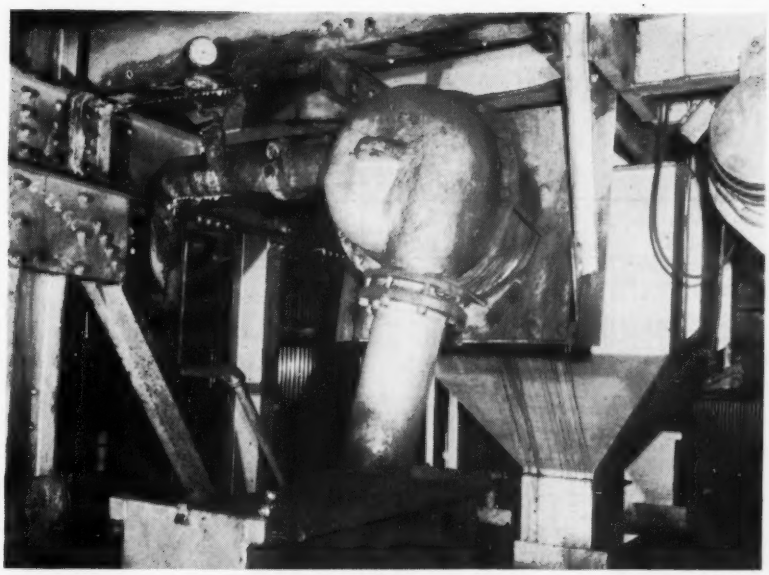
To solve these problems management quickly took steps to erect new fine-coal cleaning facilities. On July 21, 1959, the company signed a contract with Roberts & Schaefer Co. for design and erection of a heavy-medium cyclone plant. In April, 1960, the plant went into operation, employing two 20-in cyclones capable of removing 25 tph of refuse from feed.



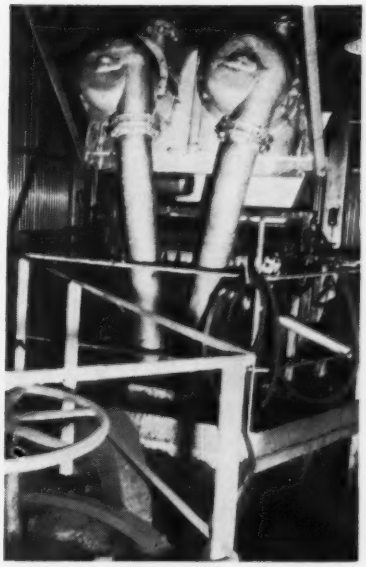
NUCLEONIC density-measuring device continuously measures specific gravity.



CENTRIFUGAL DRYERS receive clean coal with 28% moisture, yield a product with 5 to 6%. Effluent from two units flows to tailings sump.



HEAVY-MEDIUM CYCLONES remove 25 tph of refuse from 100 tph of raw feed. Clean coal and refuse products pass over curved screens on way to vibrators.



CLASSIFIER CYCLONES concentrate magnetite before it passes to separator.

Precisely For Metallurgical Market

Receiving raw coal with 10.85% ash, the cyclones yield a clean product with 3.85% ash. An AccuRay nucleonic device automatically controls the density of the magnetite solution and, as a result, washing performance is uniform and the chance of human error is eliminated.

Management lists three reasons for choosing the dense-medium cyclone plant:

1. The cleaning efficiency of the heavy-medium cyclone.

2. Short time required for construction.

3. Low construction cost.

Bartley No. 1 produces from the Pocahontas No. 4 seam which feeds to the raw-coal primary screens at a rate of 400 tph. About 50% of this input is ⅜x0, which is screened out and delivered to three air tables in the old section of the plant. Middlings and refuse from the air tables, containing 25% reject, flow to the two 20-in Dutch States Mines heavy-medium cyclones at a rate of 100 tph. Washing gravity in the cyclones is 1.40.

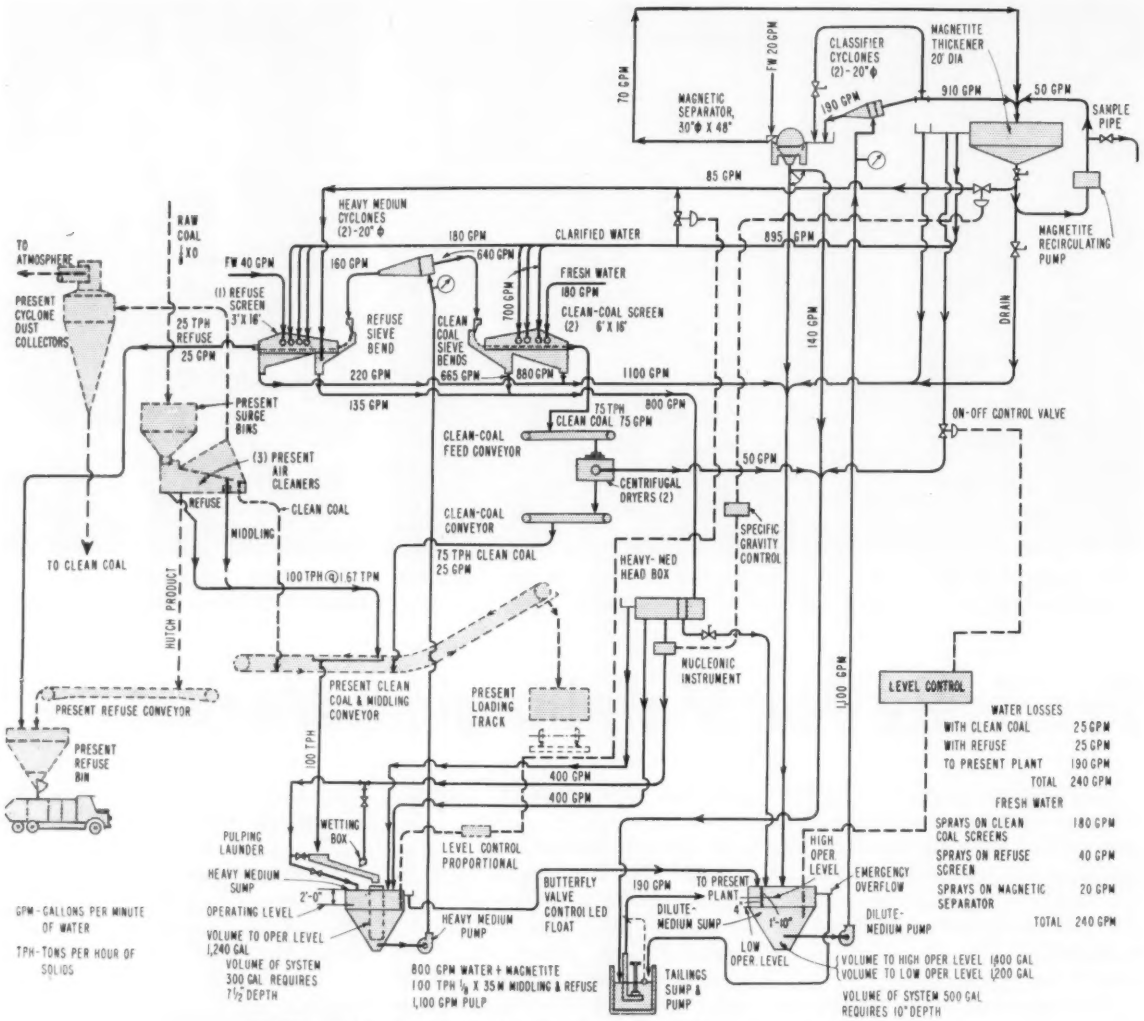
Regular tests on the clean coal and refuse from the cyclones show only 2% sink in the clean coal and 7% float in the refuse.

The Heavy-Medium Circuit

A scraper conveyor carries the air-jig mixture of middlings and refuse to a pulping launder where it is flumed

FLIGHT CONVEYOR carries clean coal from cyclones, air tables and air-table dust collectors to the loading point.

DISCUSSING plant operation are Lundy Taylor (left), foreman, and Earl Boggs, chief project engineer.



HOW coal flows through the Bartley heavy-medium cyclone plant.

into the heavy-medium sump. There it mixes with water and magnetite. A Goyne 8x10 pump pushes 1,100 gpm of the pulp through extra-heavy pipe to the heavy-medium cyclones.

Refuse, which leaves the cyclones as underflow, passes over a Sieve Bend screen that feeds a 3x16-ft Allis-Chalmers Low Head vibrator equipped with Wedge Wire ½-mm special-profile stainless steel screen cloth with maximum open area.

Clean coal leaves the cyclones as overflow and passes to a pair of 6x16-ft Lo-Head vibrators, also equipped with the same type of stainless-steel screen cloth as the refuse vibrator.

Rinsed and dewatered clean coal drops onto a scraper conveyor leading to two CMI centrifugal dryers. Feed to these units contains 28 to 29% total moisture and the dried product contains 5 to 6%. Dried coal discharges onto a scraper conveyor where it is blended with dust and clean coal from the air tables and carried to the car-loading point. Rinsed and dewatered refuse is chuted to a bin for removal by truck.

Magnitite Recovery

Underflow from the refuse and clean coal screens returns to the dilute-medium sump from which a Goyne 8x10 unit pumps it to a pair of 20-in classifier cyclones. These units feed 190 gpm to a 30x48 Dings Alnico permanent-type magnetic separator. Concentrated magnetite flows to a 20-ft-diameter magnetite thickener. Underflow from the magnetic separator returns to the dilute-medium sump.

If the washing circuit does not call for more magnetite, a Dorr-Oliver diaphram pump recirculates the thickener underflow. The thickener thus serves as a storage facility for excess magnetite. To make this storage possible the thickener is equipped with adjustable-height rakes, which are raised or lowered as the volume of stored magnetite changes.

High- and low-level probes in the dilute-medium sump automatically control the volume of water in the cyclone circuit. If the sump level becomes too high, the excess is diverted to the plant bleed. If it is too low, more overflow from the magnetite thickener is diverted to the sump.

Tailings from the magnetic separator, centrifugal dryer effluent and

Raw Feed to the New Plant

Size	Wt. %	Ash %	Cum. Wt. %	Cum. Ash %
— 4m	1.45	26.50	1.45	26.50
4m × 8m	29.93	13.90	31.38	14.48
8m × 14m	36.25	9.90	67.63	12.03
14m × 28m	19.59	8.10	87.22	11.14
28m × 35m	5.09	9.20	92.31	11.04
35m × 48m	2.38	9.70	94.69	11.00
48m × 60m	0.77	10.90	95.46	11.00
60m × 100m	1.23	10.20	96.69	10.99
100m × 200m	1.93	10.50	98.62	10.98
— 200m	1.38	10.90	100.00	10.98

Calculated ash 10.98%
Head ash 10.85%

Clean Coal from Rinse Screens

Size	Wt. %	Ash %	Cum. Wt. %	Cum. Ash %
— 4m	0.86	4.95	0.86	4.95
4m × 8m	34.99	3.75	35.85	3.78
8m × 14m	34.56	3.55	70.41	3.67
14m × 28m	20.45	3.35	90.86	3.59
28m × 48m	6.52	3.50	97.38	3.59
48m × 60m	0.59	3.75	97.97	3.59
60m × 100m	0.90	4.25	98.87	3.59
100m × 200m	0.43	10.65	99.30	3.63
— 200m	0.70	38.35	100.00	3.87

Calculated ash 3.87%
Head ash 3.85%

Dryer Discharge

Size	Wt. %	Ash %	Cum. Wt. %	Cum. Ash %
— 4m	0.32	4.45	0.32	4.45
8m × 14m	21.61	4.00	21.93	4.01
14m × 28m	34.15	3.65	56.08	3.79
28m × 35m	26.82	3.35	82.90	3.65
35m × 48m	10.05	3.30	92.95	3.61
48m × 60m	0.79	3.00	93.74	3.60
60m × 100m	3.47	3.25	97.21	3.59
100m × 200m	1.73	3.80	98.94	3.60
— 200m	1.06	6.55	100.00	3.63

Calculated ash 3.63%
Head ash 3.55%

some overflow from the thickener are diverted to a sump in the old section of the plant. It then is pumped to old workings in the mine.

Nucleonic Density Control

The AccuRay automatic density control maintains precise regulation of the specific gravity of the magnetite solution and thus plays a vital role in providing uniform washer performance. It works like this: Underflow from the clean-coal and refuse Sieve Bend screens and a portion from the refuse and clean-coal vibrators passes to a heavy-medium head box. This container provides an excess of solution for the pipe passing through the AccuRay density-measuring device. Solution passing through the device flows to a heavy-medium sump and is used as push water in the pulping launder leading to the heavy-medium sump. The remainder of the magnetite solution returns to the heavy-medium sump.

The AccuRay unit continuously measures the specific gravity of the magnetite solution by the principle of radiation absorption. It includes a source of gamma radiation mounted on one side of a pipe and a radiation detector mounted on the opposite side. Radiation absorption is proportional to the mass through which it is passing. Thus if the density of the magnetite solution changes, the concentration of radiation entering the detector changes.

The detector converts the entering radiation into an electrical signal which is amplified and used to operate the recording and control units at the panelboard. Housings for the radioactive source and detector are welded to a section of pipe, which in turn is part of the line carrying the magnetite solution. The housings not only are designed to withstand abuse but also to lower the radiation to a level below the recognized tolerances.

If the water level in the heavy-medium sump falls below the operating level an electrically controlled valve opens, admitting makeup water from the thickener overflow to the heavy-medium circuit.

The AccuRay device and indicator are connected to a Foxboro recorder and controls which are incorporated in the plant panelboard. In adding magnetite, the control unit opens a valve in the thickener underflow line, thus letting concentrated magnetite return to the dense-medium sump line. This line leads to the heavy-medium head box.

Management emphasizes that the AccuRay device is under government control and is subject to federal inspection once each year to make sure that it is safe.

The heavy-medium cyclones will extend the life of Bartley No. 1 by making it possible to recover a block of coal previously considered too dirty to mine. Anticipating the day when the reserves assigned to this mine are finally depleted, Island Creek had the heavy-medium cyclone structure assembled with high-tensile bolts which will make it possible to easily dismantle the plant and move it to a new site.

Coming in July . . . Coal Age Guidebook

A highlight in *Coal Age's* 1961 editorial plans, which include a pair of Operating Guides, the AMC Coal Show preview and post-convention reports and the 50th Anniversary issue in October, is the latest annual revision of the *Coal Age Mining Guidebook and Buying Directory*, scheduled for publication in July. Included within the covers of this issue will be a full complement of feature articles and case studies, the regular *Coal Age* departments and our usual up-to-the-minute news and new-equipment reports. You'll find the July issue of practical, textbook value.

FROM DORR-OLIVER

. . . for the preparation plant . . . for the

At the American Mining Congress 1961 Coal Show, see an actual demonstration of *FluoSolids*® . . . Dorr-Oliver's thermal drying technique

Yes . . . In booth 1709 at the 1961 Coal Show, an actual scaled-down demonstration unit of Dorr-Oliver's FluoSolids system for coal drying will be exhibited! You will actually see the principles of true fluidized drying, a process developed and pioneered by Dorr-Oliver for the coal industry.

In addition, a scale model of Inland Steel's 230 tph thermal drying plant, designed and constructed by D-O on a turnkey basis, will be shown.

FluoSolids has been accepted by the industry. To date, 11 units are either now on stream or approaching start-up date, drying a total of 3,200 tons per hour.

FluoSolids has been accepted because of . . .

Extremely high capacity — up to 800 tph per dryer.

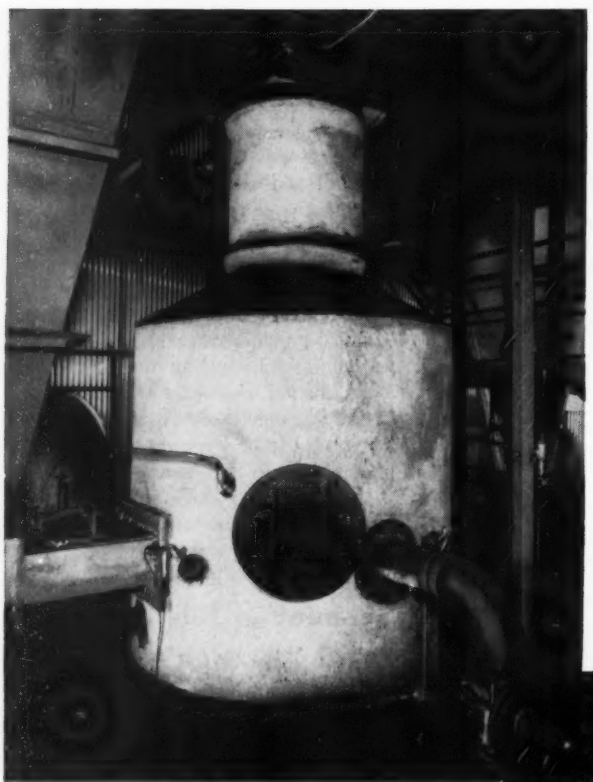
Wide size range of feed — from filter cake *directly* to 1½" x 0 coal.

High water removal — up to 50 tph per unit.

Complete instrumentation — insures uniformity of product moisture.

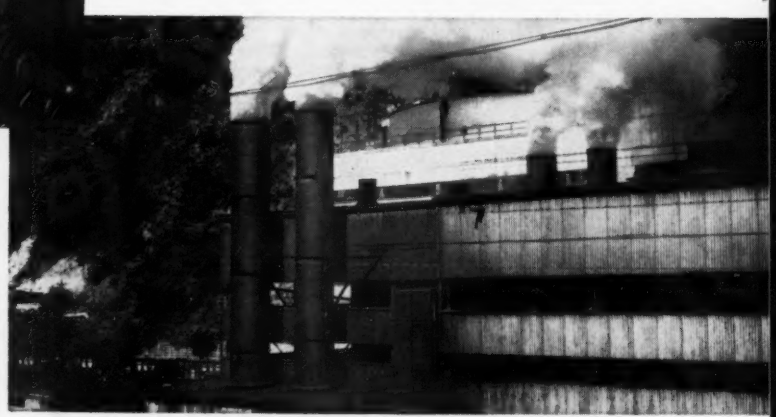
Low maintenance — no moving parts exposed to dust or hot gas.

No size breakdown — means less fines in product.



Upper section of the first installation of the FluoSolids system showing dryer and wet coal feeder. Installed at Lynville Coal Company, this system, occupying only 1350 sq. ft., has been on stream nearly 6 years, handling an average of 100 tph of ¼" x 0 coal. Actual feed variations have ranged from 69 tph to 107 tph with feed moisture varying from 10.1% to 22.4%. These are easily taken in stride.

A more recent FluoSolids installation is at United States Steel's Gary, West Virginia, plant. This drying plant comprises two 14' I.D. Dryers plus auxiliaries. Actually designed to remove 36 tph of water from 600 tph of ¼"x0 coal, the system has nearly doubled this figure of water removal.



Silhouetted view of Oliver Horizontal Filter. Initial and operating costs are low with this unit. By utilizing gravity, filtration efficiency is improved to a marked degree.

cleaning and refuse circuits

Also featured at the Coal Show will be D-O equipment units for the coal cleaning and refuse circuits: for high dewatering capacity, the American® Disc Type Filter and the Oliver Horizontal Filter are a team that's hard to beat for handling a wide size range from ½ inch to 0 mesh. Application of either, of course, depends upon the characteristics of the fines.

However, both units are alike in that they are continuous vacuum dewaterers with exceptionally high capacity and solids retention characteristics. Each shows less than 1 percent solids in the filtrate and there is no particle degradation.

In the fine coal recovery and refuse circuit, D-O's Thickener-Pump-Filter combination provides a highly effective method for recovering previously lost product, reclaiming process water and minimizing stream pollution.

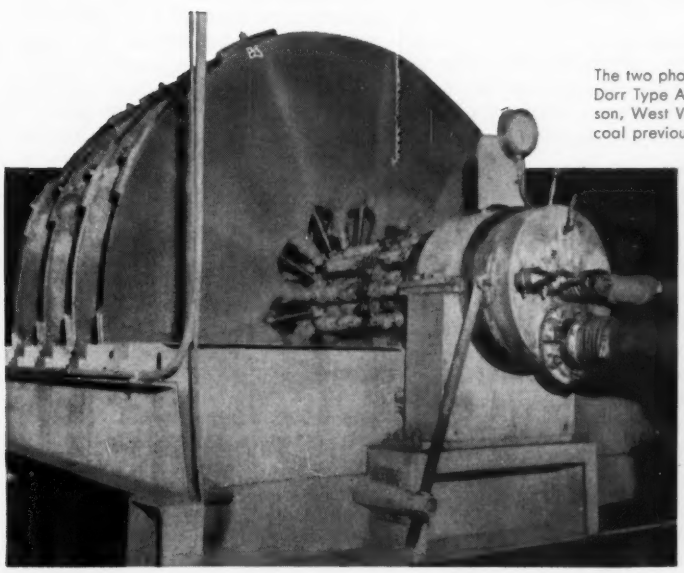
The complete Dorr-Oliver coal story will be available at the Coal Show, with working models and/or illustrations and flowsheets.

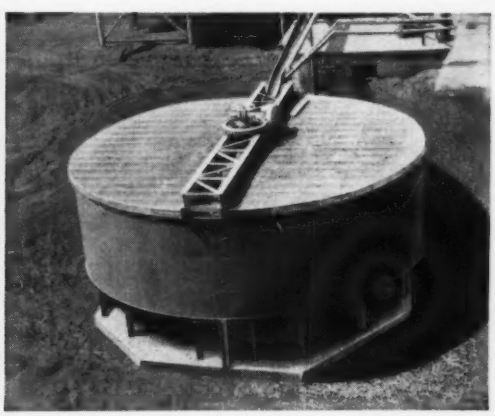
Drop in at booth 1709 while at the show, particularly if you are concerned with a specific problem regarding coal drying, cleaning or recovery. In any event come in to pick up a copy of bulletin 7101. It covers the complete D-O line for the coal industry. If your schedule does not permit your attendance at the show, just drop a line to Dorr-Oliver Incorporated, Stamford, Connecticut for your copy.

DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

The two photos below show 6' dia. x 5 disc American Filter and 35' dia. Dorr Type A Thickener at the Buckeye Coal & Coke Company, Stephenson, West Va., plant. This installation recovers 65 tpd of minus 18 mesh coal previously lost in plant effluent.





POWER for much of the equipment used in small truck mines and for personnel cars, supply tractors, and the like is obtained from industrial type batteries.

Care and Operation Of Storage Batteries

THE USE OF STORAGE BATTERIES as a source of power for mining equipment has increased in the past few years. Miniature truck-mine equipment, personnel cars, supply tractors, etc., are the main users of storage batteries. To insure the successful operation of this equipment it is essential that batteries receive the proper care and attention they require. The following is condensed from a manual entitled "Instruction and Maintenance Data," published by Gould-National Batteries, Inc., Trenton, N. J.

Placing Batteries In Service

A new battery should be given a freshening charge of from 3 to 6 hr or until the specific gravity indicates no further rise. The charge should be given at the low or finishing rate as indicated in the instructions or on the name plate. Use DC charging apparatus only. The positive and negative terminal of the battery should be connected to the positive and negative terminals of the charging source, respectively. Incorrect connections may cause permanent damage.

The temperature during charge should never exceed 110 F. Thoroughly clean all points of contact to insure good conductivity through terminal connections. Where connections are of copper a coat of Vaseline will assist in preventing corrosion.

After the battery has been installed

(Continued on p 96)

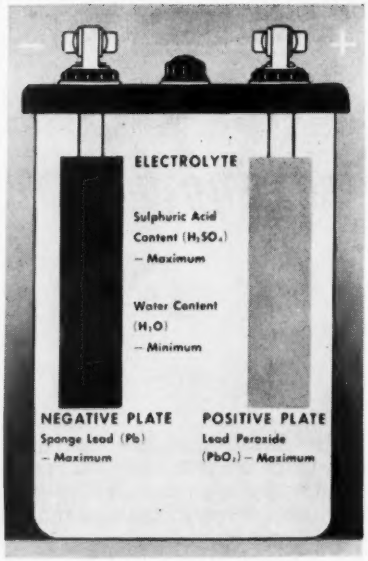


Fig. A—Charged.

Storage Battery Theory

Storage batteries do not store electrical energy. They accept the electrical energy delivered during charging periods and convert it into chemical energy which is gradually accumulated as the charge progresses. When the battery reaches its fully-charged state practically all of the active material of the positive plate is converted into lead peroxide. At the same time the active material of the negative plates changes into pure sponge lead. Since the active material of both the positive and negative plates is porous they absorb and continually contain a quantity of the electrolyte of the cell, a characteristic which may be likened to that of a sponge.

Electrolyte is a mixture of concentrated sulphuric acid (specific gravity approximately 1.830) and pure water (specific gravity 1.000). Acid and water are combined by adding the acid to the water, never the reverse, until the required density is secured.

Discharge Circuit—When a discharge circuit or load is connected to the battery terminals a chemical change takes place in the plates producing electrical energy. The active portion of the electrolyte is absorbed by both the positive and negative plates. The absorption of the active portion of the electrolyte causes a reduction in the specific gravity of the electrolyte as long as the discharge continues. Reduction in specific gravity provides an easy, con-

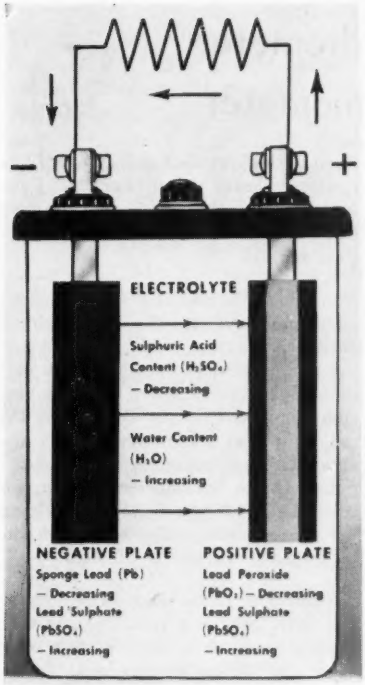


Fig. B–Discharging

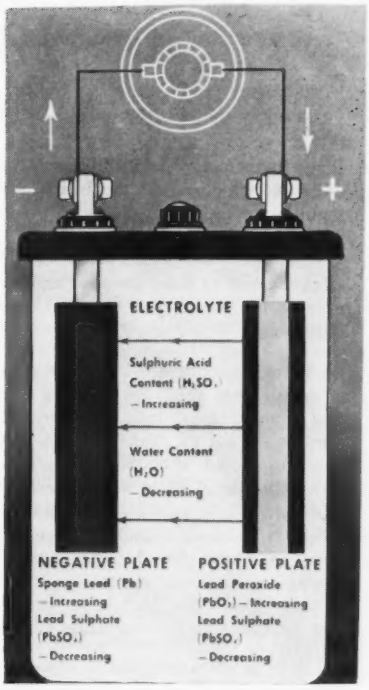


Fig. C–Charging.

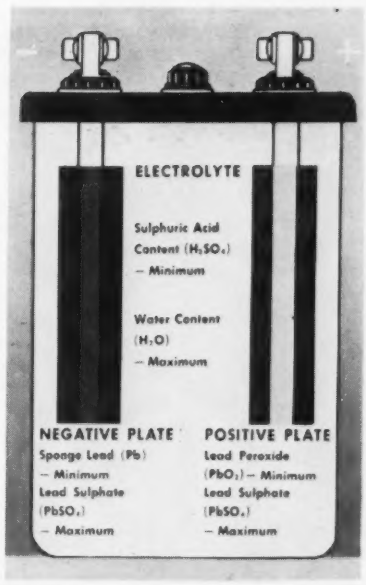


Fig. D–Discharged

venient and sure method of determining to what extent the battery has discharged.

Charge Circuit—When a charge circuit is connected to the battery terminals the electrical energy put into the battery acts on the chemicals formed during discharge and restores them to their original forms. In this process the active portion of the electrolyte which is absorbed by the plates during discharge is removed and restored to the electrolyte. Restoration of the active part of the electrolyte causes an increase in the specific gravity until the battery is restored to a fully charged condition. The specific gravity will not increase once the battery is fully charged even though the charge is continued unnecessarily.

Summing up, in a fully-charged battery the active material in the positive plates is lead peroxide, in the negative plates spongy lead, and as all acid has been delivered to the electrolyte the specific gravity is a maximum. When the battery is discharged the opposite condition exists. The positive active material is largely reduced to lead sulphate by the action of the acid and the resulting flow of electric current. Also the negatives are partly lead sulphate and sponge lead for the same reason. Since acid from the electrolyte was combined in producing sulphate in both the positive and negative plates, the specific gravity of the electrolyte becomes less and the hydrometer readings approach a minimum.

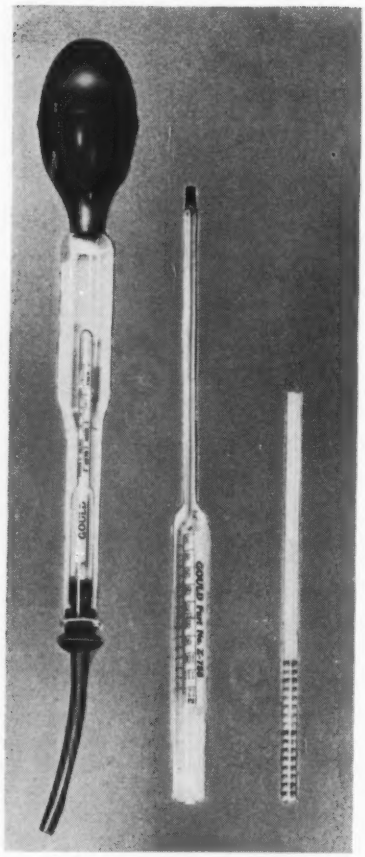
Figure A, which represents a fully-charged elementary cell of one positive plate and one negative plate will show the simple chemical notation used to describe the condition of the cell. As before, the positive plate is lead peroxide (PbO_2) and the negative plate sponge lead (Pb). Also the sulphuric acid (H_2SO_4) has been returned to the water (H_2O) resulting in a maximum density or specific gravity of the electrolyte. Chemical energy has been stored in the cell as a result of the flow of electrical current through the cell during charge, from the positive to the negative plate.

As the cell discharges (see Fig. B) the sulphuric acid divides into hydrogen and sulphate. The hydrogen reacts at the positive plate to combine with some of the oxygen of the lead peroxide to form water. This leaves free sulphate which immediately attacks the lead liberated by the escape of the oxygen and forms lead sulphate. In a similar manner lead sulphate is also formed in the sponge lead negative plate. This formation occurs slowly as the discharge progresses until, at the point of complete discharge (Fig. D) both plates contain an appreciable quantity of the lead sulphate.

The elementary cell (Fig. A) is shown in its fully-charged condition. The lead sulphate of the positive plate has been brought back to lead peroxide. Also the negative plate again becomes sponge lead. With the formation of free acid delivered to the electrolyte the density increases, and the specific gravity as indicated by the hydrometer reading has reached a maximum. Sulphate from the plates gradually combines with the hydrogen from the water to form sulphuric acid which is returned to the electrolyte until there is no more sulphate to be reduced or until the charge has been terminated. The original state has again been reached with the electrolyte at its maximum strength ready for the following cycle.

The absorption of the sulphuric acid from the electrolyte reduces the density of the liquid as indicated by the lesser hydrometer readings which are secured throughout the discharge period. When the active material of both the positive and negative plates has been converted to lead sulphate there can be no further current flow from the battery as the fundamental characteristics of a storage battery require plates of dissimilar materials immersed in suitable electrolyte to provide a difference of potential —voltage—between the terminal connections of the two groups.

In commercial service the chemical reaction is stopped long before complete sulphation occurs as the efficiency of the battery drops off very rapidly beyond a fixed low-voltage level. To permit complete sulphation to occur is economically and productively wrong.



BATTERY TEST EQUIPMENT includes hydrometer (left), thermometer and electrolyte level gage.

Use of Hydrometer And Thermometer

The hydrometer and thermometer should be wiped dry after use. They should be kept clean to prevent foreign particles from entering the battery.

Occasionally, the hydrometer should be taken apart to clean the float and the inside of the barrel. Examine the float for defects.

Reading Hydrometer—Place the rubber nozzle into the vent opening and draw enough liquid into the barrel to permit the float to ride freely so that it does not touch the side, top or bottom of the barrel. Hold vertical and at eye level. If hydrometer has to be removed from vent, pinch the nozzle tightly or place gloved finger against opening to prevent electrolyte from dripping. Read the float scale at the level disregarding the curvature of the liquid.

Temperature Correction—Correction of the specific gravity reading for temperature is made on the basis of plus or minus three points of gravity for each 10 F (acid temperature). Using 77 F as a base add three points of gravity for each 10 F above base and subtract three points for each 10 F below.

This correction must be considered a part of normal specific gravity readings because as the temperature of the acid rises, the acid expands and is not as dense. The float then rides low, giving readings lower than normal. Conversely, when the acid is cold the float rides high and the reading is higher than normal.

Reading Thermometer—Some thermometers have a scale for obtaining corrected readings quickly. Adjacent to the regular temperature scale is a column of red figures with a plus or minus sign before the figures. By reading the red figures at the mercury level the amount of correction is already computed. If the hydrometer reading, for example, is 1.260 and the red scale on the thermometer indicates plus 8 the true specific gravity is 1.268.

Electrolyte Level Gage—The electrolyte level gage is a round plastic tube approximately 6 in long with 2 in of ⅛-in graduations on one end. The 1- and 2-in graduation is heavier than the others.

To use the gage hold it in a vertical position and place graduated end through vent hole of cover down to separator protector. Close hole in top of gage with finger and remove gage and note height of electrolyte in graduated section of gage. After making observation return electrolyte in the gage to same cell from which it was removed.

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be certain that it is properly fastened in place by means of hold-down lugs on the battery or bars of the equipment so that vibration and jarring will be reduced to a minimum. If installed in a metal compartment be sure the compartment is thoroughly dry and free from moisture before the battery is installed. If installed in a locomotive or similar equipment the battery should be blocked out allowing a ⅛-in space between block and tray. Do not wedge in place. All connections between battery and vehicles should be flexible. Make sure all vent caps are in place while battery is in service. Failure to do so will result in electrolyte loss and cause corrosion to the outside of the battery and vehicle.

Operation

Batteries are rated in ampere-hours over a set period of time and should be of a proper size for the particular work intended. Extending the work means overdischarging the battery which may shorten its life. Overcharging the battery by using too high a rate of charge causing it to gas vigorously after it has reached its fully charged gravity will also shorten its life as well as waste power.

The battery should always be recharged immediately following a complete discharge. It should never be allowed to remain in a discharged condition. If service requirements demand only partial discharges it is unnecessary to recharge following each partial discharge. Hydrometer readings should be used as a guide to indicate the amount of charge remaining in the battery. When these readings indicate the battery is 75% discharged, it should be recharged.

Maintenance

Once each week inspect the battery carefully making sure that all connections are tight. Remove any dust or dirt accumulation from the top of the battery. Keep battery clean by washing it with water and blowing dry with air. Neutralize acid on covers and other parts with ammonia or baking soda at least once a month. Keep all terminals and other metal parts free of corrosion.

Replace evaporation by checking height of electrolyte daily. Never allow level to drop below top of plates. When replacing evaporation never fill cells above bottom of vent tubes. Overfilling causes loss of acid and therefore reduces capacity. Use only water approved for battery use. If in doubt use distilled water. The addition of water to the cells should always be made previous to charging the battery so that the water will be thoroughly mixed with the electrolyte. Keep records of water used and date of each filling. Excessive water

requirements are an indication of overcharging. Battery water should be kept in a glass, earthenware or rubber container. Hydrometer readings should be taken at the finish of each charge and discharge and recorded along with battery temperatures.

If acid is spilled on clothing or floor it should be neutralized immediately. If acid comes in contact with the body it should be washed off with water and area neutralized except the eye, in which case, the eye should be washed with water immediately and a doctor consulted.

Storage Battery Charging

The proper charge and the precise control of charge of the storage battery determines the life of the battery and the correct and economical functioning of the equipment powered by it. Direct current only must be employed to charge any storage battery. This can be obtained from an m-g set, rectifier or DC bus. The two systems of charging lead-acid batteries in general use are the modified constant-voltage method and the two-rate method.

Modified Constant-Voltage Method—This method employs a fixed resistance in series with the battery being charged from a constant-voltage source. Relatively high start rates result at the beginning of the charge and the end of the charge rate should be the recommended finishing rates or lower. Start-charge rate of 3½ to 4½ times the finishing rate results when a discharged battery is charged by this method. As the battery becomes charged there is an automatic reduction in charge rate because of the increase in battery voltage.

With modified constant-voltage equipment the generator voltage should be stable and constant at a value of 2.63 V times the number of cells in series to be charged. A value below this is not practical for all installations.

In charging with a modified constant-voltage source there is a tapering off of the current due to the increasing counter voltage of the battery. In using one fixed resistance in series with the battery any change in this resistance value will affect both starting-charge rate as well as finishing rate. The finishing rate resulting with modified constant-voltage charging is governed and affected by the counter voltage during the charge. Battery temperature and age are two factors which affect the counter voltage, especially toward the end of the charge. High temperature tends to reduce the counter voltage and this voltage also tends to decrease as the battery ages.

Taper charge is one that results when a battery is connected directly to a specially-designed generator having a drooping voltage characteristic greater than a normal shunt generator. There is no ballast resistance in series with the battery. The volt-ampere characteristic of this type charge is the same as obtained when using the modified constant-voltage method.

Two-Rate Method—Whenever the available charging bus voltage is above the maximum value of 2.63 V per cell it is necessary to use the two-rate method of charge. This method is one in which the charge rate is changed from that used during the first part of the charge to a lower and safer rate for the end of the charge. When using an m-g set this method employs two sections of series resistance and has two circuit breakers or contactors. With the two-rate method of charge it is possible to adjust the equipment so as to give the proper starting and finishing rates.

Most rectifier chargers for industrial truck battery charging use the two-rate method. Different manufacturers use different methods of accomplishing the change in rate from high rate to low rate. Some change transformer taps while others have resistance inserted in series with the primary transformer winding to cause the change in rate from high to low.

Boost, Equalizing and Emergency Charges—These are not systems of charge but instead are supplementary charges.

The boost charge is a charge given to the battery when it is not possible or practical to give it a regular charge. It is usually a charge of high rate and short duration given with the object of preventing overdischarge. It is given during a lull in the work cycle or at any other time when the battery is available. The boost charge is used only when the battery capacity is insufficient to meet the duty requirements and is not a recommended standard charging procedure. It would be much better to select a battery with a capacity sufficient to meet the duty cycle needs or, if this is not possible, to have two or more batteries and change them when one becomes discharged. The boost charge is standard with some shuttle-car operations where the charge period is only of minutes duration but used many times during a day.

As an assurance that maximum capacity is available when needed, the battery should periodically be given an equalizing charge. This will restore all cells in the battery to a fully-charged condition. To do this, continue the charge at the finishing rate, after the regular charge, until the specific gravity of all cells stops increasing for a period of 3 or 4 hr. If it is found that any particular cell is not charged up the same as the others at the end of a thorough equalizing charge, make an internal inspection to determine and correct the cause.

In case of an emergency requiring that the battery be recharged within as short a time as possible a starting rate twice the value of the normal starting current may be used and continued until the cells begin to gas (providing the temperature does not exceed 110 F). Then reduce the rate to normal starting rate and continue as directed for a normal charge.

Coming in May . . .

The fifth in a continuing series of *Coal Age* Operating Guides, entitled "Lubricants and Lubricators," now in preparation by Dan Jackson, will be published in the May issue. Top management and maintenance and operating officials should get a lot of mileage from this one.

Also scheduled for May is first field report on a new entry among fluidized-bed coal dryers, this one successfully handling coal up to 1-in top size.

Big-scale open-pit mining and continuous-mining case histories will be included, and the report of the meetings of the Indiana Coal Mining Institute at Terre Haute, Apr. 8, will appear.

The AMC Coal Show Preview appears in this issue beginning on p 110.

See these high production machines at the

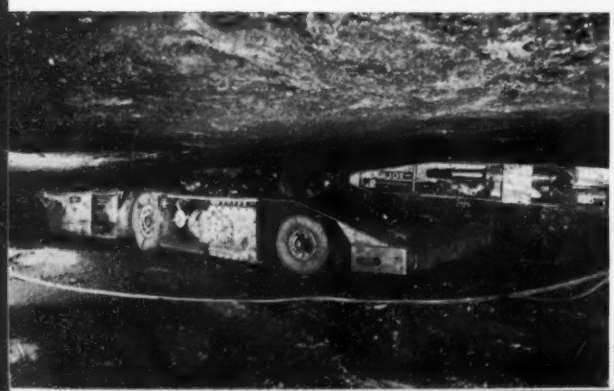
COAL SHOW

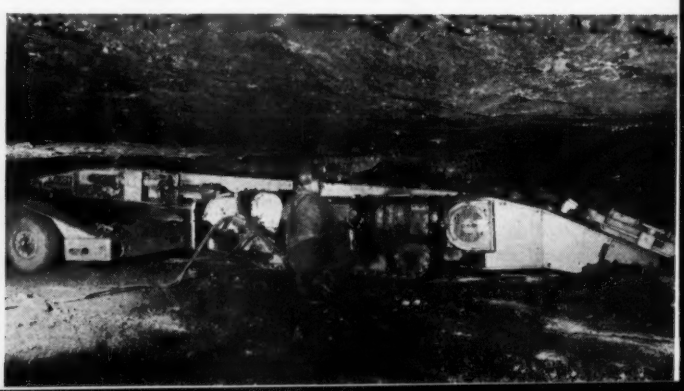
Joy Booth • Lower Lakeside Hall

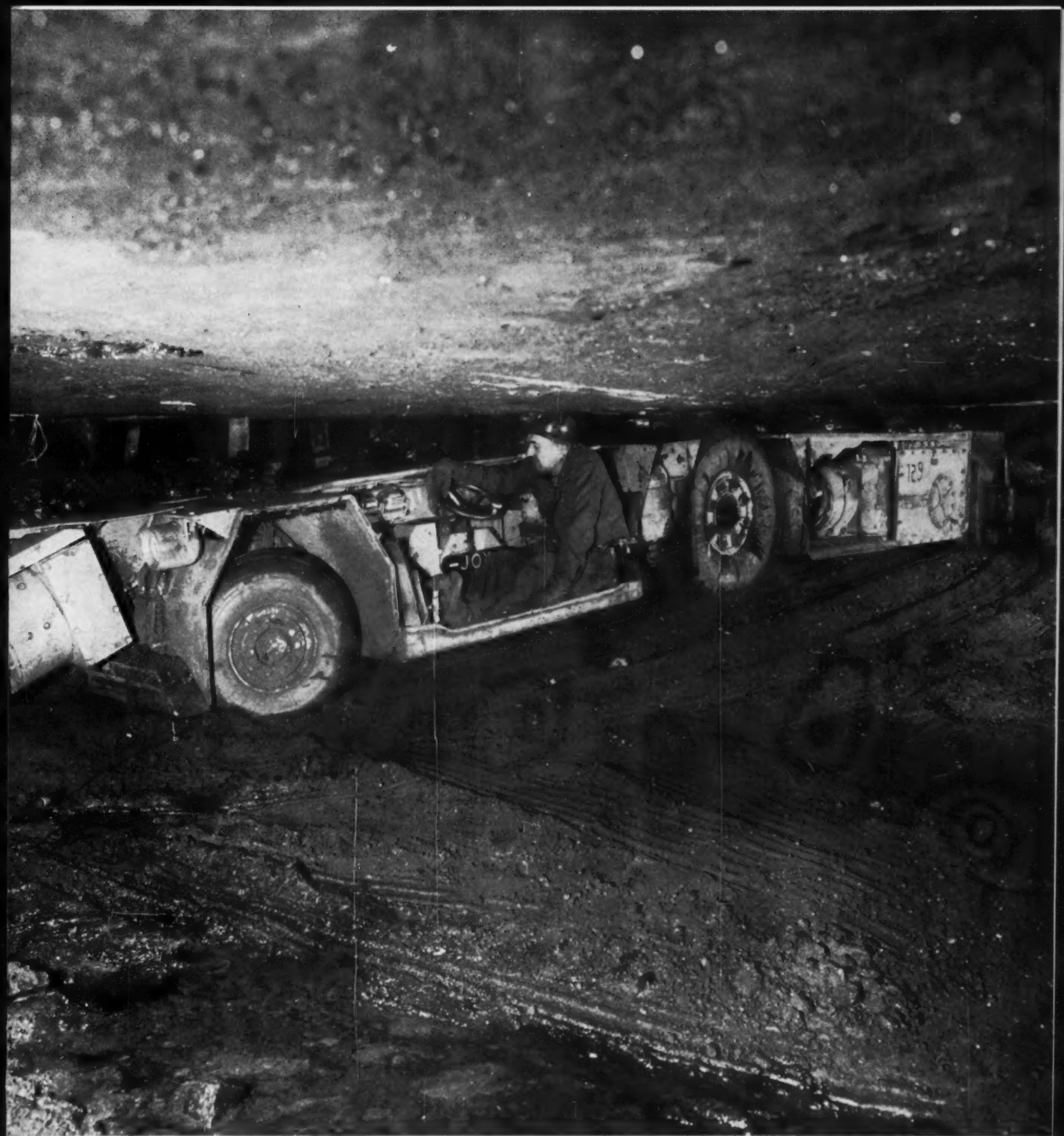
Seanor Coal jumps production with Joy's new loader-shuttle car team

The Seanor Mine of Simpson Coal & Chemical Corp. has been modernized with 18-SC Shuttle Cars and 14BU-10 Loaders—Joy's new high production team for low and medium-low seams. In the 43″ seam, the six-wheeled Joy 18-SC buggies give far greater haulage capacity than conventional cars because of their ability to bend on the dips and rolls. The maneuverability of the 18-SC's gives faster trip times, in addition to the extra capacity. New Joy 14BU-10 Loaders are used to take full advantage of this big haulage capacity. Shift in—shift out, this team maintains Seanor Coal's output at a high rate. Ask your Joy representative for complete details on Joy's new high capacity, low cost team.

Four ton load of the 18-SC's, and the fast time of the 14BU-10's has provided a big increase in output for the Seanor Mine.







Six-wheel design of the Joy 18-SC Shuttle Car enables it to take dips and rolls without topping. Operators like the safe comfortable ride between the wheels—take full advantage of the car's speed.

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING MACHINERY

JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

Mining, Preparation, Utilization Feature SME Sessions at St. Louis

DESIGN FACTORS and materials-handling in modern coal-preparation plants; stripping, continuous mining and haulage developments; safety and ventilation in coal mining; and carbonization and gasification of coal were the major topics at sessions sponsored by the Coal Division of the Society of Mining Engineers in the course of the annual meeting of the American Institute of Mining, Metallurgical and Petroleum Engineers, at St. Louis, Feb. 26-March 3.

Coal men functioning as session chairmen and co-chairmen included: Martial P. Corriveau, Clinchfield Coal Corp.; Wendell Bearce, Hanna Coal Co.; F. R. Zachar, consulting engineer; F. P. Calhoun, Rochester & Pittsburgh Coal Co.; John J. Schanz Jr., Pennsylvania State University; James P. Blair, Heyl & Patterson, Inc.; H. E. Steinman, Jones & Laughlin Steel Corp.; H. E. Mauck, Freeman Coal Mining Corp.; F. D. Wright, University of Illinois; Joseph Craggs, Peabody Coal Co.; Ernest M. Spokes, University of Kentucky; James B. Benson, Southern Coal Producers' Association; B. H. Schull, Illinois Dept. of Mines & Minerals; Carroll F. Hardy, National Coal Association.

Stripping and Mining

Peabody Coal Co's. River King Mine, W. A. Weimer, mining engineer, Peabody Coal Co., St. Louis, Mo.

Peabody's growth, in addition to some acquisitions, has reflected the construction of highly productive miners on the navigable rivers and waterways of the Midwest, a rapidly growing industrial area. Today, about three-fourths of the tonnage goes to utilities, and more than half the company's reserves are in the Kaskaskia River Valley of southern Illinois. Much is strippable. Natural conditions also favor underground mining and River King (*Coal Age,* January, 1958, pp 76-87), 30 mi from St. Louis, on the Mississippi, though presently producing solely by stripping, eventually will deep mine. Facilities include a river dock at St. Louis to gain the advantages of low-cost water movement.

River King was new in 1957, with a 70-cu yd shovel. Now, a wheel excavator has been working with the shovel for 6 mo. A cable car-haul system is used in loading at the tipple, and 5x0 refuse is pumped. The shovel in 1960 moved 21,068,070 cu yd in 6,995.18 working hours with a bank height of 75 ft. The wheel was bought to move about one-third of the burden 50 to 100 ft above the coal, leaving the remaining two-thirds to the shovel. In fact, the wheel has exceeded expectations and is moving 2,000 cu yd per hr, against 3,000 for the shovel.

Continuous Mining in the Pittsburgh Seam, Martin Valeri, assistant superintendent, The Buckeye Coal Co., Nemacolin, Pa.

With a Pittsburgh-seam thickness of 88 to 90 in, extraction with continuous miners is held to 80 in to keep draw-slate up, cutting down rock content of feed to plant, permitting washing at higher gravity, and increasing yield with little change in sulphur and ash. Nine Joy rippers and one Goodman boring-type miner are used two shifts a day for a clean-coal tonnage of 6,800. The block system of mining produces 86x86-ft pillars removed open-ending alternately across the two sides next to the gob, leaving small triangular stumps at 10-ft intervals (*Coal Age,* March, 1957, pp 58-60). Crossbars supplement the stumps, which are removed on the retreat by setting extra posts under bars on each side and then removing a post under the bar next to the stump to provide access for the miner. Lift widths are 27 ft.

A loader and two shuttle cars follow the miner. A crew comprises six men, plus two on the day shift only for odd jobs. Average output has been 570 tons per shift since November, 1959. "Mechanical trouble can be said to be nonexistent." The 6-CM miner, from November, 1959, to November, 1960, produced 153,900 tons of raw coal with mechanical delays of only 1.5% of available face time. Average bit cost was 3.1c per ton.

Continuous Mining in the Pocahontas No. 4 Seam With the Lee-Norse CM 37X Machine, R. W. Wotring, Olga No. 2 mine, Olga Coal Co., Coalwood, W. Va. (read by Charles Waine, chief engineer).

INDUSTRY MEETING—
A Special COAL AGE Staff-Written Report

Two CM 33X and three CM 37X miners are used in mining the 5- to 6-ft coal at Olga No. 2. A unit consists of the miner, two 6SC shuttle cars and, in development, a roof-bolter. Crews comprise a foreman, miner operator, two shuttle-car operators and, in pillar sections, two timbermen; in solid work, two roof-bolters.

Places are developed 18 ft wide to produce 57x92-ft blocks, which are mined by alternate open-end cuts starting on the long side. Timbering in lifts, depending on type of roof, is either crossbars or posts, with a crib at the start and another one or two along the gob with posts between. The side of the face next to the gob is kept ahead so that extra timbering is ahead for protection. This scheme also materially reduces the chances of bumping under the heavy cover.

Maintenance is stressed because of fine abrasive dust and generally to reduce downtime. Good production is obtained—for example, one machine half time in development and half in pillars (flat line) produced 15,384 tons in 36 shifts, or 71.2 tons per faceman. Peak production has been 670 tons.

Full-Dimension Systems, R. H. Jamison Jr., president, Delmont Fuel Co., Hunkers, Pa.

Two "Full-Dimension" systems have been installed at Delmont Fuel Co. mines—one a year ago as part of a conventional section and a second 4 mo ago for Colmol mining in a pillar section. The full-dimension system provides continuous transportation from the face unit to the main line using a series of interconnected mobile and articulated chain conveyors which, at Delmont, will advance and retract for development of a 5-heading entry with 120 ft move-ups or mining of pillars 210 ft in all directions from the main belt.

At 10B, the first installation, 4.2-ft coal, a 36-in mainline belt is employed with parallel supply track to within 300 ft of the face. In this 300 ft materials are handled by battery tractor and trailers. The latter are loaded outside and brought in on flat cars, four trailers per car (*Coal Age,* March, 1961, pp 94-97). Two 10RU machines with high-speed hydraulic drills and bugdusters are employed with a Long 188 loader. Section crews comprise 10 men. Actual loading time, including place change, is 13 to 14 min, 20-ft places on development, 25-ft

on retreat. A move is made approximately every 95 cuts (3,700 tons in development), and the average time required is 75 min.

With the Colmol, rates of 4 to 5 tpm are being obtained in pillaring with the "Full-Dimension" system, increasing recovery and making for maximum safety.

Requirements and Advantages of an All-Belt Mine-Haulage System, William J. Orlandi, assistant to the vice president, Peabody Coal Co., St. Louis, Mo.

Mine No. 10, Pawnee, Ill., was opened in 1951 in a 5x10-mi block of solid, level coal 7 ft thick, with no major fault areas. Belt haulage was favored by the size of the block and the natural conditions. No turns would be required and grading and brushing would be cut. In addition greater unit efficiency was expected because of fewer haulage delays, along with greater concentration, limiting the necessary maintenance for production. Separate haulageways from bottom to face for both coal and supplies would be facilitated.

Conventional loaders discharge into shuttle cars which take the coal to panel belts discharging to gathering conveyors, in turn feeding to the mainline (*Coal Age,* September, 1954, pp 82-97). After 8 yr of experience all the expected advantages of belt haulage have been realized, including those from the development of the ropeframe type by Peabody officials. With this equipment and knowledge gained from experience, belt installation now costs $1.75 a foot, compared to $2.40 a foot for the original in spite of several wage increases.

Supplies are handled in bundles or pallets. Transfer to rubber-tired face units is by 1-ton monorail mounted hoists.

Mine No. 10 produced 4 million tons in 1960, and over 4½ million is expected in 1961. Total capital investment in haulage to date, including supply track, has been 3½ million dollars. Increased production is being attained with no increase in the capital investment originally planned.

Coal Preparation

Design of the Loveridge Plant, H. L. Washburn, chief engineer, and W. A. McConnell, Mountaineer Coal Co., Fairmont, W. Va.

A major goal in the design of the Loveridge plant, Fairview, W. Va. (*Coal Age,* December, 1959, pp 92-98) was operating with a minimum of attendants. As a result of a simple flowsheet and automatic controls the plant can produce 7,000 tons of cleaned coal per shift, 75% thermally dried, with a main-plant operator, dryer operator and loading-point operator. Along with automatic samplers, facilities include a 15,000-ton storage bin with 26 feeders for blending at a steady rate of 1,250 tph, jigs, double-deck tables, cyclones, centrifuges, screen and flash dryers, and thickeners and filters for a closed water circuit.

Thunderbird Colleries, Thomas R. Hightower, assistant preparation manager, Thunderbird Colleries Corp., Indianapolis, Ind., and Myron W. Mellor, vice president, McNally Pittsburg Mfg. Corp., Pittsburg, Kan.

Put into operation to serve a new deep mine at Farmersburg, Ind., the Thunderbird plant was started up in March, 1959, though still operating at about half capacity as a result of market conditions. Capacity is 600 tph, and facilities include a conveyor-weigher, 1,000-ton bin, rotary breaker, roll and hammer crushers for cleaned coal and middlings, a super washer (4½x0), centrifugal dryers, automatic samplers, and overhead-belt loading. In this loading, employing a belt with automatically controlled tripper, 14 cars are placed on each side and the belt is started. Then the cars are loaded one by one in turn automatically. The plant is designed to load 3,000 tons per shift, two shifts per day, with two foreman, one laboratory technician, and eleven men.

Coal Preparation Plant Facilities, Old Ben Mine No. 21, Sesser, Franklin County, Ill., J. W. MacDonald, vice president in charge of engineering, Old Ben Coal Corp., Benton, Ill.

With a need for removing less than 4% of the raw feed to provide a superior product, an opportunity was afforded for simplified design and increased automation where advantage or economy was anticipated. Design included protection of opportunity for predrying in advance of air cleaning, and accommodations for the addition of dense-medium separating equipment if warranted in the future. Raw-coal storage also may be added if found desirable.

An automatic hoist feeds the plant (*Coal Age,* July, 1959, pp 100-105) at a rate of 800 tph, the coal first going to a breaker house for reduction to 6x0. The 6x¼ coal, with crushed middlings reject and ¼x0 air cleaning reject goes to a jig, with ¼x0 to air tables. Fine coal from the jig (¼x48M) is deslimed and centrifuged, then joined with the air-cleaner product. Some of the special plant features are centralized lubrication, pushbutton sampling gates on three loading tracks, and remote recording of scale weights and car numbers.

Operating labor in the plant includes one operator, a utility man for the washing and air-cleaning plants, and a car-loading supervisor. Other labor is: a 2-man engine crew, one man for refuse disposal, and a man at the shaft bottom.

Materials-Handling Aspects of Fine-Coal Preparation, E. V. Bowman, vice president, operations, Winding Gulf Coals, Inc., Tams, W. Va., and E. J. Hurst, vice president and general manager, J. O. Lively Mfg. & Equipment Co., Beckley, W. Va.

The aim in a new 160-tph 2-shift plant for ¼x0 metallurgical coal was minimum degradation to keep down the percentage of minus 60M for lower plastometer readings—in other words, minimum pumping and conveying. Cleaning and drying is done on tables and in centrifugal and fluid-bed dryers. In the flow the coal is pumped only once and conveyed only twice, the ¼x8M is bypassed around the centrifuges, all vertical drops are kept to a minimum and 45-deg chutes are used wherever possible, only two 90-deg ells were used in the raw-coal pipeline. Turns in sluices and flumes were kept to a minimum, and the fluid-bed dryer was selected because it was believed it would handle the coal more gently.

An added bonus was a reduction in plant cost through reducing the quantity and size of water-clarification equipment. Final results show that the cleaned and dried product contains 17.5% minus 60M, compared to 13.5% for the raw feed.

Maximizing the Profit of a Coal-Preparation Plant by Linear Programming, Fred D. Wright, professor of mining engineering, University of Illinois, Urbana, Ill.

Production of a coal-preparation plant is governed by many restrictions, such as, the tonnage of different products and blends that can be sold in a given period, capacities and output proportions of the cleaning and sizing units, blending proportions, quality specifications, and costs and prices of the various products. Determination of the tonnage of each product and blend that should be made to obtain maximum profit is difficult unless a systematic method, such as linear programming, is used.

To illustrate the basic method in linear programming, Old Ben No. 9 preparation plant is used as an example to illustrate how equations can be written and solved. Using an IBM 650 computer, three problems, each requiring more than 56 equations and 63 structural variables were solved. One was adjusting the yield of various sizes for maximum profit with certain restrictions on sales of certain sizes, requiring 20 equations. Two was the same with no restriction on sales of one product, and three with the period of restrictions on sales as 40 operating days instead of 10.

Programming is worthwhile if there is considerable choice in the products made. If there is little choice the problem solves itself.

Refuse and Slime-Disposal System of

Maple Creek Preparation Plant, L. A. Anderson, general plant foreman, U. S. Steel Corp., Maple Creek, Pa.

A significant portion of the tonnage at Maple Creek (*Coal Age,* June, 1959, pp 94-102) is rejected in washing, with about one-tenth of the reject in the form of minus 100M material. Another problem was that the nearest available disposal site was 4 mi away. Four separate rejects are produced: picking lump, crushed to minus 8-in; 5x¼ from the Chance cone, dewatered by vibrating screens; ¼x100M from Deister tables, Akins classifier; and Convertol and other refuse silts, handled as a slurry.

All refuse over 100M goes to a bin, is loaded into dropbottom cars, hauled 4 mi to a special shaft, dumped into skips, hoisted automatically, and disposed of in 8-in layers by a bowl-type scraper. The disposal area for minus 100M is adjacent and is formed by an impounding dam. The tailings are collected and settled by flocculants and are pumped through a 5-in line to a borehole at the shaft and thence to the pond, equipped with a clear-water skimmer well.

Froth Flotation

Economic Justification for Froth Flotation, James W. Miller, preparation engineer, Robinson & Robinson, Inc., Charleston, W. Va.

In many instances justification for capital expenditures is based entirely on reduction in direct mine costs. This can have pitfalls–for example, failure to take into consideration the effects of possible increases in shipped moisture and reduction in effective carbon as a result of ash increase in metallurgical coal.

A method of determining the payoff time for a $120,000 investment, incorporating the effects of ash and moisture increases in value of the coal at point of use, also gives consideration to increased preparation cost, depreciation of the new equipment increased royalty, welfare, association dues and taxes on the coke production, freight rate, and income taxes on increased profits. In the arbitrary case used for illustration, total mine cost was cut 17c per ton, making the payoff time 13 mo. Taking everything into consideration, however, with no increase in overall ash, profit per ton is cut to the point where payoff time is 4½ yr. If ash is 2% higher, as an alternative, payoff time is further increasd to 6 yr.

"It is personally thought that froth flotation is one of the more attractive investments in the coal industry today." The payoff period, however, depends on more than merely reduction in direct mine cost, and each operator must determine the period for his operation and decide if it justifies the expenditure.

Coal Flotation, Dewatering Flotation Concentrates, and Handling Flotation Tailings in Germany, 1960, Karl Sallmann, Eschweiler Bergewerke Verein, Kolscheid, West Germany.

Of the 121 washers in West Germany, 43 include flotation plants handling 26,000 tons of the total daily throughput of 280,000 tons. Individual plant capacities vary from 40 to 120 tph. Both capacity and number of plants are increasing, with treatment of coking fines the main consideration, but also with increased slurry production as a result of sprinkling at the face, the need for preventing excess loss of values, and more-stringent pollution regulations as additional factors.

A survey of 32 flotation plants showed a feed ash content of about 20%. The aim in treatment is 7 to 8%. Because fines percentages are higher, the solids content of pulp fed to flotation units has been cut to maintain separating efficency. Filters normally are employed for drying, usually preceded by flocculation. Other types of equipment are being used or tested, but have not yet shown signs of displacing the filter. Tailings disposal is a major problem, and one of the solutions being suggested is burning them into cement as brick or sintering them for block production.

Cost of flotation in West Germany comes out to around 3.36 DM per metric ton of feed, including flotation, filtration and tailings disposal in ponds.

Coal Flotation in the Durham Division of the National Coal Board, H. Macpherson, divisional coal-preparation engineer, Team Valley Trading Estate, County Durham, England.

Increased mechanization, damper coal because of sprinkling, and stricter pollution regulations have now made froth flotation an accepted process in all new Durham plants. The aim in Durham practice is to keep the content of over 30M (B.S.) as small as possible in the feed, with the proper proportion of the 30x60 fraction as well. Desliming is being studied, and may become common as the percentage of clays and extreme fines increases.

Vacuum filters of both the drum and disk types are employed for the cleaned coal, with filter presses for tailings. Flocculation of tailings is normally achieved with starch or polyelectrolytes. Problems involved in the use of flocculants have been accentuated by the trend to closed water circuits. At present, it is felt that trial is the best method for choosing a type for a specific operation.

Dewatering methods are the subject of increased study. One claim is that over-all moisture is improved by increasing the top size of the coal in the filter cake, though Durham experience indicates that the moisture content of the final product (say 1x0) is raised by taking more coarse out of the centrifuges and throwing it into the filters. Ultimately, the goal should be filter-cake moistures conforming to the figures for large coal. For the present the best possibility is thermal drying.

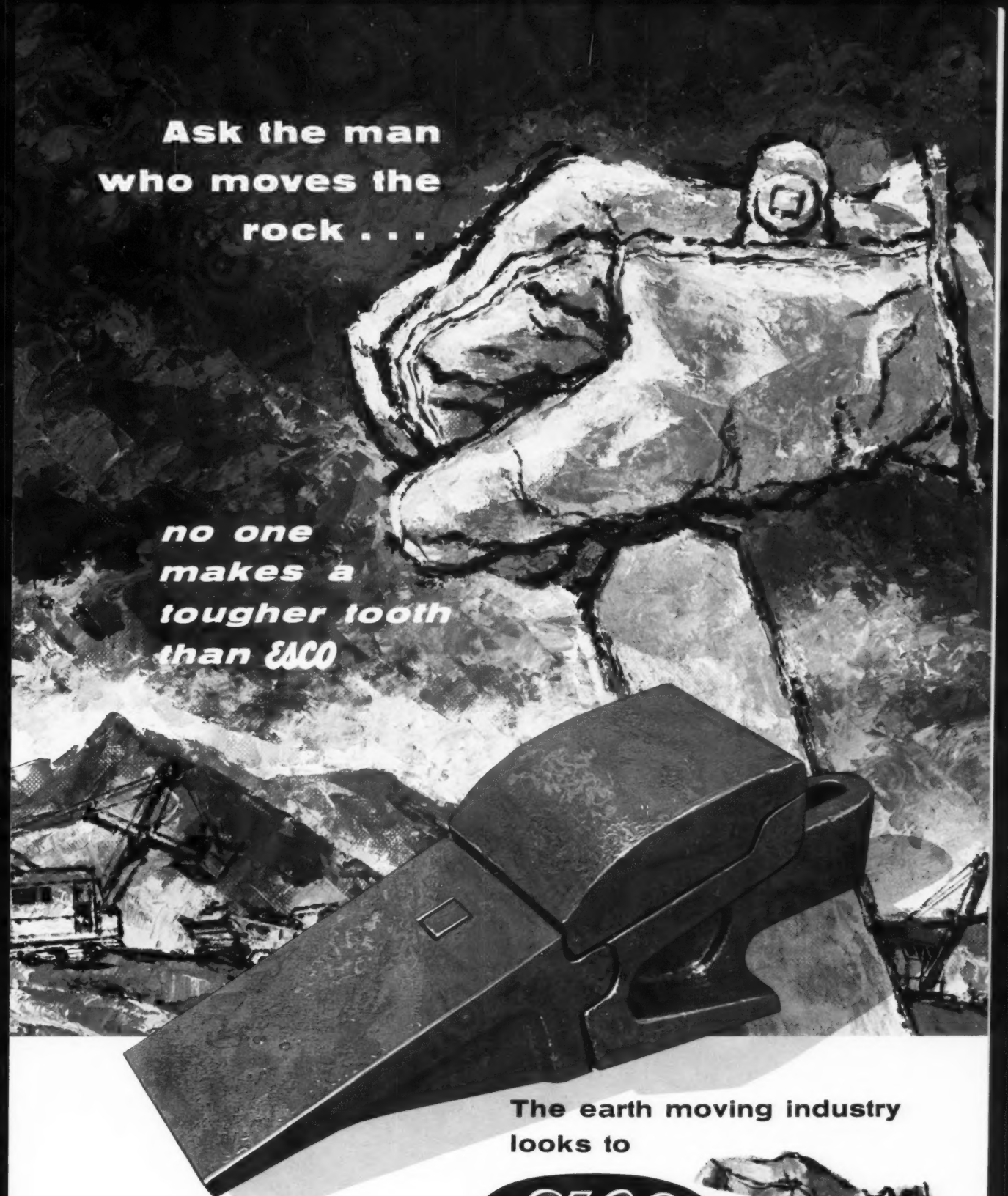
Continuous Filtration and Thickening of Coal-Flotation Concentrates and Tailings, L. Dale and D. A. Dahlstrom, Eimco Corp., Pittsburgh, Pa.

Direct dewatering of cleaned flotation coal with a vacuum filter normally results in lowest cost. Two things of major interest are the filtration rate and cake moisture. As with all types of coal, the filtration rate goes down with increase in percentage of –200M fines. It also is affected by the fact that in dewatering flotation coal the solids content of the feed is less.

When ash is above 8% and appreciable slimes are present, which flotation tends to disperse even more than in ordinary processing, filtering becomes more difficult and flocculation may be necessary. And as slimes increase dilution must increase. Hydraulics becomes more of a factor in operating on flotation coal–the rate is lower and moisture is higher unless the filter, especially if converted, is modified to handle the product. For the best in cake moisture, good desliming, good vacuum and sufficient time are essential.

Flotation tailings are high in ash–up to 75% plus, are always fine and are always dilute–2% solids or less. Lagooning is most common method. A second method is handling with other fine tailings either in or after thickening. Flocculation may have to be done a second time. Third, tailings may be dewatered by themselves, in special types of filters. In any event, tailings should not be discharged by themselves since they are very difficult to handle. The preferred method is to place the tailings on top of the coarse refuse on the refuse conveyor.

Discussion–R. L. Llewellyn, preparation engineer, Eastern Gas & Fuel Associates, Pittsburgh, Pa. When it comes to handling fine coal and water, the flotation unit may result in the lowest-cost circuit in addition to providing additional revenue coal. Flotation will recover 85 to 90% of the coal in the stream, against 70 to 75% for cyclones. If filters are considered, the cake normally is the highest in ash. The flotation product is the lowest. As to manpower, in the normal modest-sized plant, no more is required. There may be, however, additional problems in filtration–not enough vacuum pumps, need for a froth breaker and more 200M fines.



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Safety and Ventilation

Use of Sonic Techniques in Exploring Coal-Mine Roof Strata, Charles E. Morgan Sr., consulting physicist, and Thomas C. Miller, mining health and safety engineer, U. S. Bureau of Mines.

Unconformities, including faults, fissures, rolls, kettle bottoms and other inconsistencies, many of them hidden, emphasize the need for a detection device and test method, which should be light and portable, low in power demand, safe for mines, and easy for mine personnel to operate, read and interpret the results. Theory suggests that reflecting a wave train into the rock could yield useful information. The sonic wave is one type.

Theory and actual experiments indicate the practicability of the method.

Use of High-Expansion Foam on an an Actual Mine Fire, C. William Parisi, director of safety, Pittsburgh Coal Co., Library, Pa.

First attempts to fight a fire June 10, 1960, at Montour No. 4 mine, involved use of one of the mine's fire cars, but smoke at the time, 30 min after ignition prevented immediate application. An effort was made to move the smoke by increasing air flow, but 2 hr elapsed before this could be done and the fire grew and spread, with numerous falls and an increase in combustible gases in the return from the fire.

Previously the company had become interested in foam and had bought a Safety Development Corp. unit. When fighting with fog and water proved ineffective the unit was brought in. Within a short time after it was started, the combustible gases in the return began to drop. The unit was stopped from time to time and the men entered to fight the fire directly with water until the combustible concentration began to rise. This intermittent operation continued for several hours until a decision was made to seal off the area, using the foam unit to facilitate this operation by reducing the heat and combustible gases from the fire.

The unit could stop open fires but could not extinguish the hot burning material underneath the large falls. Aside from this question, the foam unit can be brought into service in a short time and cuts combustible gases in the return faster than water. At Montour No. 4 it played a definite part in preventing spread of the fire, and permitted sealing with only a relatively small area affected considering the type and intensity of the fire.

"The foam generator generally should not be considered a cure-all nor a last-resort fire-fighting method. It is, however, an important addition to other conventional fire-fighting equipment."

The Control of Mine Ventilation Utilizing Multiple Main Fans, J. A. Boyle, director mine inspection, and O. S. Conn, ventilation engineer, Frick Dist., U. S. Steel Corp., Uniontown, Pa.

Some 37 yr of experience ventilating with multiple-fan installations have been gained in the Frick Dist. At Robena mine some 55 million tons have been mined with the system (*Coal Age*, January, 1959, pp 96-100). With 165 mi of main intakes, including 60 mi of primary haulage roads, and 164 mi of returns, plus 60 mi of bleeder entires, one force and seven exhaust fans are employed. Total volume is 2,500,000 cfm, which is 20% over normal air requirements. These fans exhaust 6,000,000 cu ft of methane every 24 hr.

Success with multiple fans involves, first, self-closing doors at all return exits to prevent air reversal in event of fan failure; second, separation doors in the return airways to establish definite airflow directions to the various fans; third, periodic tests with fans stopped to determine effect in air distribution; fourth, prepared plans of action in case of failure of any fan.

Overall, the system provides two-split section ventilation, emergency fire door arrangements and regulators to afford a smoke-free escape route in case of emergency; a 0.5% maximum allowable methane content in the return of any split; and a minimum of 10,000 cfm on haulage roads.

Utilization and Markets

Adaptability of Illinois Coal for Use in Iron and Steel Production, Hubert E. Risser, mineral economist, Illinois State Geological Survey, Urbana, Ill.

Illinois coal is being increasingly used for the production of metallurgical coke, in part because of its nearness to Illinois and Indiana steel centers more than offsets claims for better oven performance for other coals. Technological trends in upgrading and blending Illinois coals, together with economic trends, were largely responsible for past increases in use of Illinois coal. Another factor that will strengthen the position of Illinois coal in the future is declining reserves and availability of the major coking coals now in use. If population, standard of living and consumption of steel continue to increase as they have in the past, "it is very likely that within the next couple of decades coking coal from traditional sources simply will not be available."

Competitive Markets: The Fossil Fuels, Myles E. Robinson, director, and William L. Kurtz, senior economist, Dept. of Economics and Coal Transportation, National Coal Association, Washington, D. C.

Since 1950, in areas of direct competition, the three fossil fuels picked up 4.1 trillion Btu. Natural gas gained 5.5 trillion and oil 1.5 trillion, while coal lost 2.9 trillion. Thus in the 10 yr since 1950 coal dropped from 50.6% of the total competitive-fuel market to 33.8%, only slightly ahead of natural gas.

In the utility field, use of coal grew 83.3% in 10 yr, oil 17.0% and gas 158.9%. The gas growth, however, was far short of its overall growth in the competitive market. Excluding internal combustion, coal in 1950 accounted for 69.1% of the steam-electric total fuel consumption, with gas at 18.4% and oil at 12.5%. Ten yers later the figures were: coal, 66.9%; gas, 25.1%; oil, 8.0%.

By regions, oil and gas are growing more rapidly percentagewise in the Middle Atlantic region. In the South Atlantic coal's 10-yr gains also were less than the combined gains percentagewise. The East North Central region consumes more fossil fuels than any other. Here coal's positions (96% of the total) has not changed but gas is a threat. Coal has gained more rapidly than other fuels in the East South Central states.

Fuel Interchangeability—Measuring Its Extent in the U. S. Energy Market, W. Gibson Jaworek, petroleum economist, The Ohio Oil Co., Findlay, Ohio; John J. Schanz Jr., associate professor, Dept. of Mineral Economics, Pennsylvania State University, College Park, Pa.

Excess fuel-production capacity in the early 1960s indicates that fuel interchangeability should become more prevalent in the increasingly competitive energy markets. This interchangeability is possible in at least 65% of energy utilization, with the proportion varying in the industrial, electric generation, residential and commercial, and transportation areas. Present relationships are conditioned on present technology, and could be seriously altered in the future, particularly in transportation.

With such a fluid energy market, interfuel competition can be expected to increase, particularly in sectors showing the greatest growth potential. "Foremost in this group is electric generation, in which the fossil fuels will have to reckon one with another, as well as with atomic energy."

Some Aspects of the Competition Between Fuels in the U. S., Eugene F. Eisemann Jr., Planning & Economics Dept., Gulf Oil Corp., Pittsburgh, Pa.

The volume forecasts for the fossil fuels depend upon the assumptions made as to price relationships. "Unfortunately future price levels will be affected greatly by political and administrative activities, such as, import restrictions, a national fuels policy and FPC regulation of gas sales. Presently, the price of

natural gas is artificially low because the field price is not permitted to seek a competitive level in the open market. Prices of residual fuel oil are artificially high because of import restrictions.

The new administration is committed to a national fuels study, and the results of this study on prices are almost impossible to predict. The economics of supply and demand offer little assistance when forecasting in this area of competitive industrial energy.

Natural Gas and the Competitive Fuel Market, Francis J. Quinn, Budget & Statistics Dept., Transcontinental Gas Pipeline Corp., Houston, Tex.

Natural-gas pipelines are competitive with each other and with the coal and oil industries, plus the electric industry. Gas has captured markets from oil, which took them from coal. Oil men contend that gas prices have been held to an artificially low level by regulation.

The coal industry is attempting to monopolize the industrial and utility markets through government intervention under the guise of concern for national welfare through advocacy of a "National Fuels Policy." "Such a policy is contrary to American principles and would result in the individual's loss of freedom of choice and, ultimately in less reserves of preferred fuels because of diminished exploration efforts."

Know Your Coal, J. T. Peters and N. Shapiro, Applied Research Laboratory, U. S. Steel Corp., Monroeville, Pa.

Coal is a heterogeneous substance composed principally of plant material that has been altered by a complex geochemical process to form rock. The science of coal is called "Anthrocology." Its aim is finding out why coals differ. The practical application is determining how differences affect their preparation and utilization. Petrographic data are fundamental to understanding the behavior of coals during mining, pulverization, washing, blending and coking—for example, the mining rate, equipment wear and size consist in continuous mining; adjusting pulverization to utilize coal reserves to the maximum; the distibution of entities with various characteristics during different stages of the washing process; crushing to achieve the proper blend; and how the various entities that affect blending and coking are present.

Gasification of Solid Fuels in the Wellman-Galusha Gas Producer, George M. Hamilton, manager Wellman-Galusha Gas Equipment Dept., The Wellman Engineering Co., Cleveland, Ohio.

The improved Wellman-Galusha producer has the flexibility to use bituminous coal, anthracite or coke, and also the ability to change quickly from low to high rates without noticeable change in gas quality.

With natural gas and oil constantly increasing in cost, economy-minded companies would do well to look into the possibilities of the producer unit of modern design. "The pendulum has swung far out. The return swing could prove profitable to those with sufficient understanding and far-sightedness."

Coal Gasification for Production of Synthesis and Pipeline Gas, Martin A. Elliott, director, Institute of Gas Technology, Chicago.

Coal can be completely gasified today by a variety of processes suitable for synthesis or high-Btu pipeline gas. Today's technology embraces extensive use of oxygen and fluid-bed gasifiers, and operation of gasifiers at elevated pessures or under slagging conditions. Processes have been or are being developed for production of high-Btu gas either by catalytically converting synthesis gas to methane, or by direct reaction of coal with hydrogen to produce a methane-rich gas.

Coal is used for synthesis and public-utility gas in many parts of the world today. Under present conditions in the U S., coal is not the most economical raw material for either type of gas. However, in the opinion of many individuals, high-Btu gas from coal will be necessary in 10 to 20 yr.

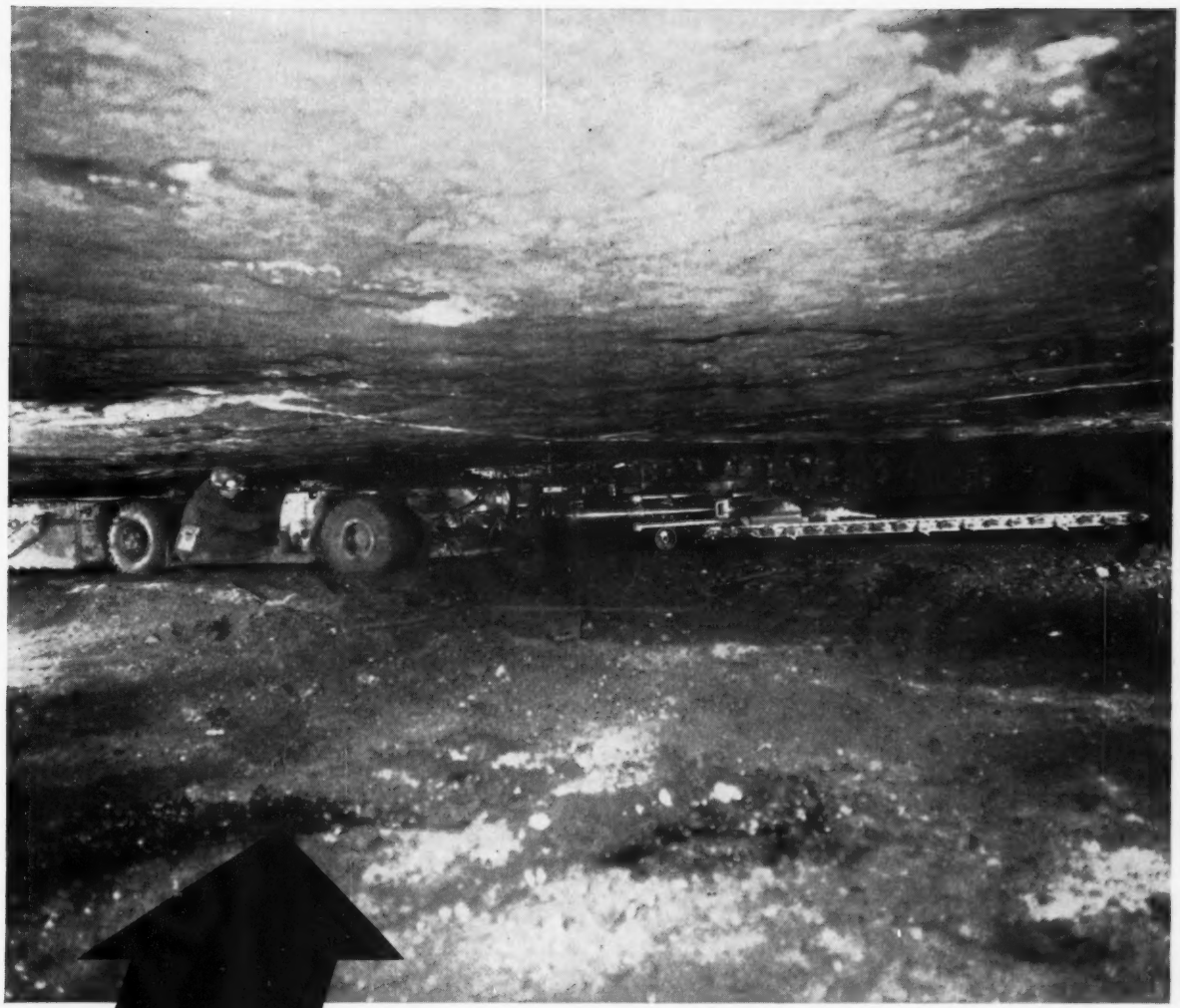
Bench-Scale Experiments on Low-Temperature Carbonization of Lignite and Subbituminous Coal at Elevated Pressure, W. H. Oppelt, project coordinator, lignite utilization, and W. R. Kube, chemical engineer, Grand Forks Lignite Research Laboratory, U. S. Bureau Mines, Grand Forks, N. D

Five low-rank noncoking coals were carbonized in both nitrogen and hydrogen atmospheres at pressures from atmospheric up to 1,000 psi, using an electrically heated bench-scale carbonizer. Nominal test temperature was 940 F. Data were sought on agglomeration; yield of solid, gaseous and liquid residues; conversion of carbon in the coal; and degree of retention of the potential heat of the coal charge in the solid residue.

Design and Preliminary Operation of a Slagging Fixed-Bed Pressure-Gasification Pilot Plant, W. H. Oppelt, project coordinator, and G. H Gronhoud, project leader, Grand Forks Lignite Research Laboratory.

Gasification may play an important part in the development of the large lignite deposits of North Dakota.

Fixed-bed pressure gasification using lump as the feed offers advantages in heat economy and low oxygen consumption. Therefore it was decided to try this method modified for liquid-slag discharge of ash. Favorable results were obtained.



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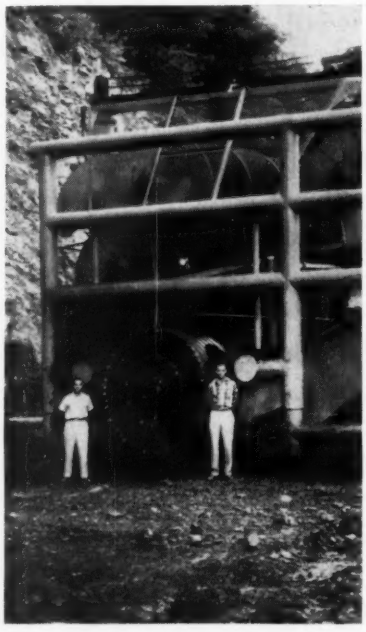
LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

ON THE JOB FOR KENTUCKY OAK, the "world's biggest" coal auger, with a diameter of 7 ft, has reached production rates of as high as 25½ tpm. Twin chutes at the left permit quick switching from one truck to another in loading. A third chute may be added to permit special loading of 6-in lump. The 7-ft cutting head mounts 100 bits.

How Kentucky Oak Mines With the 7-Ft Auger



With 3 ft more diameter, new walking auger drills 7-ft holes to depths of 216 ft at speeds up to 17 fpm, using crew of four. Each foot yields 1½ tons of coal.

"WORLD'S BIGGEST" is the distinction held by the 7-ft coal auger which has been producing since mid-1960 for the Kentucky Oak Mining Co., near Hazard, Ky. Owned by R. H. Kelly and W. B. Sturgill, Kentucky Oak is recovering the Hazard No. 9 seam, which is suitable for domestic, industrial and utility applications.

The 7-ft Kentucky Oak auger is the 150th machine manufactured by Compton, Inc., a subsidiary of the Joy Mfg. Co., which notes that the cutting head is at least 3 ft larger in diameter than any other in the

coal industry. Rated production of the machine is 15 tpm. In actual operation, it already has produced as high as 25½ tpm.

In preparing the coal seam for mining, Mr. Sturgill points out, his company has terraced land and built a system of graded, well-drained roads that eventually will open new home sites, as well as agricultural and orchard acreage, in what was considered worthless mountainside land.

Penetration—Up to 17 Fpm

Thickness of the coal being mined by the "Kelly Giant," as employees have nicknamed the 93-ton auger, varies from 8 to 11 ft. A four-man crew operates the auger after the highwall is prepared. The crew members also take care of greasing the machine, minor maintenance and clean-up and other chores around the auger.

Standard penetrating speed of the auger is 10 fpm. However, speeds of 17 fpm have been achieved in solid coal with hard sulphur streaks ranging from ¼ to 3 in thick, observes Mr. Kelly. A foot of advance produces 1½ tons of coal. Extreme speeds of 17 fpm are achieved, Mr. Kelly continues, by employing carbide-tipped bits, a 700-hp diesel engine and the highest bit speed ever used—1,100 fpm.

The giant, equipped with seven sections of auger—each 30 ft long and weighing 5 tons—plus the cutting head, can penetrate 216 ft into a coal seam. It requires ½ min to halt drilling, hydraulically lower a new 30-ft auger section into place, couple up and resume drilling. After a hole is finished, it takes 4 to 8 min, depending on the depth, to withdraw the auger sections, hydraulically rack them up in the machine frame, move the unit 8 ft and begin drilling a new hole. The hydraulic system is operated by a 160-hp diesel engine—also part of the machine.

Dual-Chute Truck Loading

Standard practice is to leave 10 to 12 in of coal between each hole as roof support. The entire auger machine moves as one unit from hole to hole on hydraulic walkers. The conveyor belt runs along the side of the machine from front to rear and is equipped with a hydraulically-controlled divided chute which permits one truck to load while another is getting into loading position. The installation of a third chute between the other two to load a third truck with plus 6-in coal for storage and shipment in winter months is contemplated. The divided chute means that no time is lost while trucks are getting into position. A 30-ton truck can be loaded in 2 min or less.

The auger head consists of three concentric cutting rings making 2½- and 3-in kerfs and using a total of 100 bits. The outer ring, with a 7-ft outside diameter, has 56 equally spaced bits. The intermediate ring, with a 4-ft outside diameter, has 32 bits and the center ring, 18-in outside diameter, 12 bits. Auger thrust is accomplished by hydraulically controlled cables pulling on the drill-motor frame, which pushes the auger before it.

The auger operation was launched in 1959 using originally two 48-in Compton augers, each with four-man crews. With the introduction of the 7-ft auger, production was tripled and coal recovery was increased considerably. The smaller augers drilled double holes—one on top of the other.

In addition to the 70 mi of outcrop, Kentucky Oak holds rights to an adjacent 70 mi of virgin coal in the same seam. Two other mineable seams account for a reserve of some 140 million, making a total reserve of some 300 million tons of steam-grade coal in this and nearby properties owned by Messrs. Kelly and Sturgill.

This reserve, observes Mr. Sturgill, was considered unmerchantable until modern concepts of burning in new utility plants, plus the cooperation of Louisville & Nashville R. R., "made possible the marketing of this type of coal, and the employment of many men who have had no jobs since the working out of the deep mines in 1957." "We expect to recover more coal from this strip and auger job than the total tonnage mined over a 30-yr period in the original underground operation," Mr. Sturgill adds.

Harry B. Ranier and his son, Harry H., owners of one of the largest construction companies in eastern Kentucky, handle the auger and strip production. The Raniers refer to the 7-ft auger as a "wheel horse" that can be easily adapted to accommodate twin 48-in augers, triple 32-in augers, four 24-in augers or five 20-in augers. The unit includes a combination 400-amp welder-lighting machine.

Better Land After Mining

Also noting the changes resulting from availability of modern coal-mining equipment and new methods for burning coal in utility plants, Mr. Kelly points out that they are responsible for a profitable operation making work for many people who only a few years ago were faced with economic difficulties because the deep mines were being abandoned or worked out. In developing for auger and strip mining, the company has built miles of permanent, well-graded, well-drained roads. These, Mr. Sturgill comments, will make effective forest-fire breaks and eventually will be turned over to Knott County for public use.

In addition to creating a system of roads to reach the coal seam, he continues, the company's mining operation will open heretofore inaccessible areas of mountainous land, making it suitable for home sites, truck gardening, pasture lands and orchards.

The company already has made plans to plant thousands of fruit trees and grape vineyards on mountain sections that have been terraced to make level spots for mining. These terraces also will be available for home sites for residents who now are forced to live in the valley. The fruit trees and grapes will be planted near the top of the mountain, the only elevation in the area where vegetation is protected by fog from early fall and late spring frosts.

There are presently underway plans to plant 10,000 fruit trees on surface owned by the Townsell Combs heirs, large holders of surface rights in the area. The planting will be done on heretofore practically worthless steep mountainside land which has been flattened and terraced by the strip and auger operation. The enthusiasm of the Combs family for the planting of fruit trees had led other surface owners to contemplate similar planting at an early date, and it is expected that this new industry will give a major lift to the economy of eastern Kentucky.

The 1961 Coal Show . . .

Program Preview

Monday, May 15, 10:00 AM

Opening Session

Convention Welcome, Jesse F. Core, vice president—operations—coal, U. S. Steel Corp., and chairman, Coal Div., American Mining Congress; F. Stillman Elfred, chairman of the board, Peabody Coal Co., and chairman, program committee, American Mining Congress; D. E. Davidson, vice president for sales, Link-Belt Co., and chairman, Manufacturers' Div., American Mining Congress; Robert M. Hardy Jr., president, Sunshine Mining Co., and chairman, Western Div., American Mining Congress.

A National Fuels Policy, John F. Kelley, assistant secretary for mineral resources, U. S. Dept. of the Interior.

Office of Coal Research, by the director.

A Look at Coal's Future, Charles J. Potter, Rochester & Pittsburgh Coal Co.

Tuesday, May 16, 9:00 AM

Conventional Mining

Conventional Mining in Thin Seams, Clyde H. Storey, Princess Coals, Inc.

Shooting With Air in Low Coal, Joe L. McQuade, Maust Coal & Coke Corp.

Maintenance at Moss No. 3, Ballard Taylor, Clinchfield Coal Co.

Future of Conventional Mining, Jack Matheson, Island Creek Coal Co.

Tuesday, May 16, 9:00 AM

Strip Mining

Inclined Vertical Drilling and Blasting, B. J. Kochanousky, Pennsylvania State University

Economics of Large vs. Small Haulage Units, E. F. Eckhardt, American Electric Power Service Co.

Combination Truck and Belt Haulage, Robert S. Humphreys, Stonefort Coal Mining Co.

Interconnection of Hoist and Crowd Controls—A Step Toward Shovel Automation, A. M. Vance, Westinghouse Electric Corp.

Tuesday, May 16, 9:00 AM

Management and Cost Control

Profitable Control of Production and Transportation Through Operations Research, David B. Hertz and Norman B. Olson, Arthur Andersen & Co.

Control of Supply Costs Through Inventory Control, W. J. Eck, The Chesapeake & Ohio Ry.

Saving Money Through Modern Purchasing and Inventory Control, R. A. Dodds, Truax-Traer Coal Co.

Employee Testing, John E. Osmanski, Island Creek Coal Co.

Tuesday, May 16, 2:00 PM

Haulage and Power

Experience With Silicon Rectifiers, John A. Dunn, Island Creek Coal Co.

Use of Brakeman Cars, Emil J. Servant Jr., Olga Coal Co.

Application of Diesel Units Underground, Tennessee Coal, Iron & R. R. Co.

Yieldable Mine Arches, George L. May, Bethlehem Mines Corp.

Wednesday, May 17, 2:00 PM

Coal Preparation

Effect of Continuous Mining Equipment on Cleaning-Plant Performance, W. H. Noone, Semet Solvay Div.

Heavy-Medium Cyclones, William Benzon, Bethlehem Mines Corp.

An Electric Utility Looks at Its Future Use of Coal, Roger D. Curfman, Cleveland Electric Illuminating Co.

Recent Progress in the Thermal Drying of Fine Coal, R. E. Zimmerman, Paul Weir Co.

Wednesday, May 17, 2:00 PM

Strip Mining

Application and Performance of Wheel Excavators, Henry Rumfelt, Bucyrus, Erie Co.

Auger-Mining Standards and Comparative Costs, Louis F. Zager, Helmick & Associates.

Horizontal Air Drilling, N. O. Lewis, Robbins Machine & Mfg. Co.

Increasing Equipment Availability Through Maintenance, Thomas P. Bradford, Hanna Coal Co.

Wednesday, May 17, 2:00 PM

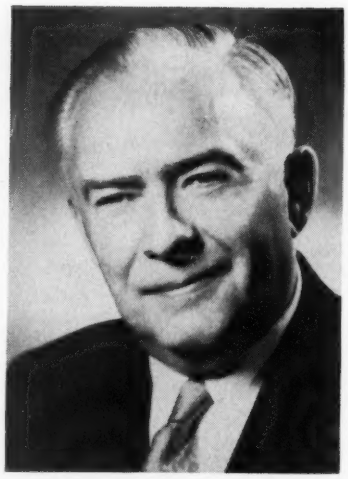
Safety

Human Engineering in Safety, C. G. Evans, The North American Coal Corp.

Benefits of a Sound Safety Program, C. O. Kane, Armco Steel Corp.

Evaluation of Various Means of Fighting Machine Fires Underground, Donald Mitchell, John Nagy, Edwin M. Murphy, U. S. Bureau of Mines.

Design of Pillars for Overburden Support, Charles T. Holland, Virginia Polytechnic Institute; discussion by



F. Stillman Elfred, Chairman of the Board, Peabody Coal Co., National Chairman, Program Committee

Roy L. Dulaney, Mountaineer Coal Co.

Thursday, May 18, 9:00 AM

Coal Preparation

Planning for Efficient Cleaning-Plant Operation, James B. Girod, Frick Dist., U. S. Steel Corp.

Latest Developments in Continuous Analysis, Loy A. Updegraff, Bituminous Coal Research, Inc.

Substitutes for Standard Materials to Reduce Maintenance Costs, V. D. Hanson, Consolidation Coal Co.

Processing and Disposal of Coal-Flotation Tailings, Donald A. Dahlstrom, The Eimco Corp.

Thursday, May 18, 9:00 AM

New Operations

Orient No. 5 Mine, Thomas L. Garwood, Freeman Coal Mining Corp.

The Thunderbird Mine, W. A. Endicott, Ayrshire Collieries Corp.

Segco No. 1 Mine, J. E. Brown Jr., Southern Electric Generating Co., and G. C. Dyar, Alabama By-Products Corp.

Sunnyhill No. 9 Mine, John H. Plump, Peabody Coal Co.

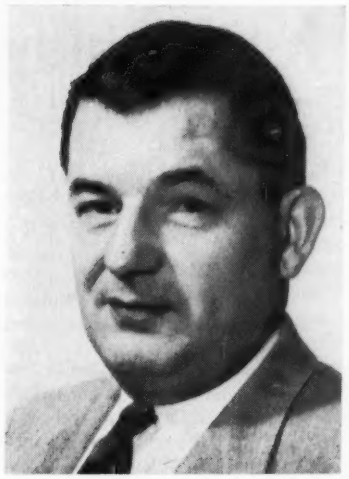
Thursday, May 18, 2:00 PM

Continuous Mining

Continuous Mining in Thin Seams: *Paper No. 1,* Norman Yarborough, Harlan Fuel Co.; *Paper No. 2,* J. L. Marshall, Imperial Coal Co.

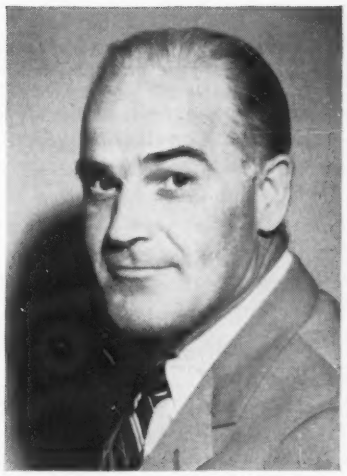
Maintenance of Continuous-Mining Equipment, Arthur Towles, Bell & Zoller Coal Co.

Face Ventilation and Dust Control, John S. Todhunter, Barnes & Tucker Co.



Jesse F. Core, Vice President—Coal Operations, U. S. Steel, Chairman, Coal Division, AMC

Raymond E. Salvati
President, Island Creek Coal Co.
President, American Mining Congress



D. E. Davidson
Vice President for Sales, Link-Belt Co.
Chairman, Manufacturers' Division, AMC

The 1961 Coal Show . . .

Equipment Preview

In two sections, this preview of equipment, materials and services scheduled for exhibit at the 1961 Coal Show of the American Mining Congress, Cleveland, Ohio, May 15-18, gives you first, starting on this page, a complete roundup classified for easy checking. **"Bullets," or black dots indicate advertisements in this issue.** To locate an advertiser, turn to the Advertisers' Index at the back of this issue. New products are highlighted in the panel on the following page.

Detailed descriptions of many of the new products are presented in the second section of this preview, starting on p 119.

Loading Machines

• **Eimco Corp.,** Salt Lake City, Utah—Eimco loading machines, including Model 105 conveyor loader.

• **Goodman Mfg. Co.,** Chicago 9, Ill.—Low-vein loading machine.

• **Jeffrey Mfg. Co.,** Columbus 16, Ohio—Line of loading machines.

• **Joy Mfg. Co.,** Pittsburgh 23, Pa.—New 14 BU-10 loader, 24 in high.

• **Long-Airdox Co.,** Oak Hill, W. Va.—Loaders for "Full-Dimension" mining.

Continuous Miners, Bits and Accessories

• **Allegheny Ludlum Steel Corp.,** Pittsburgh 22, Pa.—Machine bits.

• **Bowdil Co., Canton, Ohio**—Heavy-duty continuous-miner chain.

• **Cincinnati Mine Machinery Co.,** Cincinnati 25, Ohio—Rap-Lok holders and chain and other set-screwless lugs, chains and holders.

• **Goodman Mfg. Co.,** Chicago 9, Ill.—Type 428 continuous borer, Type 201 low-vein continuous miner and Wilcox Miner.

• **Jeffrey Mfg. Co.,** Columbus 16, Ohio—Jeffrey Colmols.

• **Joy Mfg. Co.,** Pittsburgh 23, Pa.—Borers and rippers, and Compton CU-61 and CU-42 continuous miners.

• **Kennametal, Inc.,** Bedford, Pa.—Full line of bits including strong-shank types.

• **Lee-Norse Co.,** Charleroi, Pa.—Latest models of low-coal miners.

• **Metallurgical Products Dept.,** General Electric Co., Detroit, Mich.—Carboloy bits.

• **Mining Progress, Inc.,** Highland Mills, N. Y.—Coal-planer systems and longwalling equipment.

Frank Prox Co., Inc., Terre Haute, Ind.—Complete line of ripper and trim chains for continuous miners and borers; PT-2 and PT-3 taper-shank bits.

• **Vascoloy-Ramet Corp.,** Waukegan, Ill.—CMC and CMF bits for quick-change blocks; CCMJ bits for auger-type miners.

Stripping

American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill.—Amsco loading bucket and Simplex dipper teeth.

• **American Cyanamid Co.,** New York 20, N. Y.—Blasting agents and supplies.

• **Austin Powder Co.,** Cleveland, Ohio—Complete display of explosives and blasting supplies.

• **Atlas Powder Co.,** Wilmington 99, Del.—Full line of blasting agents, including new physical form for AN-oil blasting, and casting overburden with explosives energy.

Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio—

New Products Scheduled for Display

For your convenience the new products that will be shown at Cleveland, as reported by exhibitors, are listed in the following tabulation. Where detailed descriptions have been provided by the exhibitors they appear in the featured products section beginning on p 119. A star (★) preceding the listing in this panel indicates this fact.

Deep Mining

★ **Roof-bolting equipment.** Acme Machinery Co., Huntingdon, W. Va.

★ **Quick-change bits.** Allegheny Ludlum Steel Co., Pittsburgh 22, Pa.

★ **"MineDuck" exhaust tubing.** American Brattice Cloth Corp., Warsaw, Ind.

★ **RBD-30SD Roof-bolt drill.** Chicago Pneumatic Tool Co., New York 17, N.Y.

★ **Bit holders for miners.** Cincinnati Mine Machinery Co., Cincinnati 20, Ohio.

★ **RF 44 "Ratio Feeder."** Mining Equipment Div., Columbus-McKinnon Corp., Tonawanda, N.Y.

★ **Model 105 excavator.** Eimco Corp., Salt Lake City, Utah.

★ **AC electrical equipment for underground.** Ensign Electric & Mfg. Co., Huntington, W. Va.

★ **AC magnetic belt starter.** Ensign Electric & Mfg. Co., Huntington, W. Va.

★ **DBE roof-control drill for low coal.** J. H. Fletcher & Co., Huntington 18, W. Va.

★ **Low track tamper.** J. H. Fletcher & Co., Huntington 18, W. Va.

★ **Building Block AC mine-load centers.** Specialty Transformer Dept., General Electric Co., Schnectady, N.Y.

★ **New ropeframe conveyor design.** Goodman Mfg. Co., Chicago Ill.

★ **1070 heavy-duty AC shuttle car.** Goodman Mfg. Co., Chicago, Ill.

★ **428 continuous boring machine.** Goodman Mfg. Co., Chicago 9, Ill.

★ **Low-vein continous miner.** Goodman Mfg. Co., Chicago 9, Ill.

★ **100 L auger miner.** Jeffrey Mfg. Co., Columbus 16, Ohio.

★ **16-RB bottom cutter, CD-61 face drill, 14BU-10 loading machine and 18-SC hinged shuttle car.** Joy Mfg. Co., Pittsburgh 22, Pa.

★ **CU-42 "Compton miner," for 6- to 10- ft seams.** Joy Mfg. Co., Pittsburgh 22, Pa.

★ **20-RC twin-diesel shuttle car.** Joy Mfg. Co., Pittsburgh 22, Pa.

★ **FDC roof bit.** Kennametal, Inc., Mining Tool Div., Bedford, Pa.

★ **P-1044 permissible tractor.** Kersey Mfg. Co., Bluefield, Va.

★ **Counterbalance Spooling," hoist-drum conversion.** Lebus International Engineers, Dallas, Tex.

★ **Medium-low coal miner, CM32.** Lee-Norse Co., Charleroi, Pa.

★ **C rubber-tired Tournatractor.** LeTourneau-Westinghouse Co., Peoria, Ill.

★ **Type LRB roof bolting machine.** Long-Airdox Co., Oak Hill, W. Va.

★ **M-S-A "Airslide" rock dust distributor.** Mine Safety Appliance Co., Pittsburgh 8, Pa.

★ **Self-advancing roof support.** Mining Progress, Inc., Highland Mills, N.Y.

★ **C-200 "Loadveyor," elevator-loader.** Nolan Co., Bowerston, Ohio.

★ **PT-2 and PT-3 tapershank bits and holders.** Frank Prox Co., Inc., Terre Haute, Ind.

★ **"Coalmover" coal belt.** Manhattan Rubber Div., Raybestos-Manhattan Co., Passaic, N.J.

★ **Automatic Drop-bottom cars.** Sanford-Day Corp., Knoxville, Tenn.

★ **AC control apparatus for mine elevator service.** Haughton Elevator Co., Div. of Toledo Scale Co., Pittsburgh 12, Pa.

★ **CMC shrouded bits.** Vascoloy-Ramet Corp., Waukegan, Mich.

★ **CCMJ "Red Bits" for coarse cutting.** Vascoloy-Ramet Corp., Waukegan, Mich.

Stripping

★ **"Accomite" and A-N agents.** American Cyanmid Co., New York, N.Y.

★ **"Cyaprime" primers for blasting agents.** American Cyanamid Co., New York, N.Y.

★ **"Cyagel" slurry-type explosive.** American Cyanamid Co., New York, N.Y.

★ **Amsco "Simplex" shovel teeth.** Amsco Div., American Brake Shoe, Co., Chicago Height, Ill.

★ **1250-W dragline; 270-shovel.** Bucyrus-Erie Co., So. Milwaukee, Wis.

61-R blasthole drill. Bucyrus-Erie Co., Milwaukee, Wis.

90-yd and 115-yd shovels. Bucyrus-Erie Co., So. Milwaukee, Wis.

★ **420-hp tractor, 60-ton trailer.** Caterpillar Tractor Co., Peoria Ill.

★ **C-350 "REICHdrill."** Chicago Pneumatic Tool Co., New York, N.Y.

★ **Electrically-powered rotary rig.** Davey Compressor Co., Kent, Ohio.

★ **Motorized wheel for haulers.** General Electric Co., Locomotive and Car Equipment Div., Erie, Pa.

★ **TS-14 twin-engine scraper.** Euclid Div., General Motors Corp., Cleveland.

Coal Show Exhibits

Lima equipment for coal stripping and loading.

Bucyrus-Erie Co., S. Milwaukee, Wis.—Earthmoving shovels and draglines.

• **Caterpillar Tractor Co.,** Peoria, Ill.—Earthmoving machines, including Cat 630 coal hauler for 60-ton loads.

• **Chicago Pneumatic Tool Co.,** New York 17, N. Y.—REICHdrill overburden units.

• **Davey Compressor Co.,** Kent, Ohio—New electric-driven, rotary, air-blast overburden drill.

• **E. I. du Pont de Nemours & Co., Inc.,** Wilmington 98, Del.—Explosives and full line of blasting supplies.

• **Electric Steel Foundry Co.,** Portland 10, Ore.—Buckets and parts.

• **Euclid Div.,** General Motors Corp., Cleveland 17, Ohio—TS-14 twin scraper and other earthmoving machines.

General Electric Co., Schenectady 5, N. Y.—Motorized wheel for large haulers.

H & L Tooth Co., Montebello, Calif.—Shovel teeth.

Herb J. Hawthorne, Inc., Houston 8, Tex.—Full line of Blue Demon all-formation drill bits.

• **Harnischfeger Corp.,** Milwaukee 46, Wis.—P&H shovels and draglines.

• **Hendrix Mfg. Co.,** Mansfield, La.—Type MH heavy-duty mining buckets.

Hughes Tool Co., Houston, Tex.—Hughes roller-cone bits.

• **International Harvester Co.,** Chicago 1, Ill.—Model 95 Payhauler; TD-30 tractor; Drott Four-in-One units, and engines.

• **Joy Mfg Co.,** Pittsburgh Pa.—Overburden drills, including models for inclining blastholes.

• **KW-Dart Truck Co.,** Kansas City 41, Mo.—100-ton coal hauler with 700-hp engine.

• **Le Roi Div.,** Westinghouse Air Brake Co., Sidney, Ohio—New rotary drill rigs, Models LRD-2 and LRD-3.

• **Link-Belt Co.,** Chicago 1, Ill.—Operations of the LMG bucket-wheel excavator.

Link-Belt Speeder Corp., Cedar Rapids, Iowa—The ¾-yd LS-78 excavator.

• **Manitowoc Engineering Corp.,**

At the 1961 AMC Coal Show

★ **"Paydozer."** Frank G. Hough Co., Libertyville, Ill.

★ **120-cu yd coal hauler.** KW-Dart Truck Co., Kansas City, Mo.

★ **LRD-3 rotary overburden drill.** Le Roi Div., Westinghouse Air Brake Co., Sidney, Ohio.

★ **85-yd dragline.** Marion Power Shovel Co., Marion, Ohio.

★ **Dual coal-recovery auger.** Salem Tool Co., Salem, Ohio.

★ **Air-powered drills.** Schramm, Inc., West Chester, Pa.

★ **"Super-Aire" bits.** Security Engineering Div., Dresser Industries, Inc., Dallas, Tex.

★ **"Spenite" booster.** Spencer Chemical Co., Kansas City, Mo.

★ **Replaceable-cone bits.** Varel Mfg. Co., Dallas, Tex.

★ **Portable blasthole drill.** Winter-Weiss Co., Denver, Colo.

Preparation

★ **Sludge centrifugal.** Bird Machine Co., S. Walpole, Mass.

★ **Air classifiers for dry materials.** Buell Engineering Co., New York, N.Y.

★ **Automatic plastometer.** Commercial Testing & Engineering Co., Chicago 1, Ill.

★ **Fluid-bed sizing.** Dorr-Oliver, Inc., Stamford, Conn.

★ **75A "Hi-Vi" electric feeder.** Eriez Mfg. Co., Erie, Pa.

★ **Gundlach "Cage-Paktor."** T. J. Gundlach Machine Co., Balleville, Ill.

★ **"Cyclo - Cell' flotation.** Heyl & Patterson, Inc., Pittsburgh, Pa.

★ **"Vibroplane" Reineveld.** Heyl & Patterson, Inc., Pittsburgh, Pa.

★ **Automatic tramway.** Interstate Equipment Corp., Elizabeth, N.J.

★ **"Fluid-Flo" dryer.** Link-Belt Co., Chicago, Ill.

★ **Heavy-duty bunker vibrator.** Martin Engineering Co., Neponsit, Ill.

★ **Crusher-protecting toggle.** McLanahan & Stone Corp., Hollidaysburg, Pa.

★ **"Wobbler" and "Hydrostroke" feeders.** National Iron Co., Div. of Pettibone Mulliken Corp., Cedar Rapids, Iowa.

★ **Norton dense - medium washer.** Nortons - Tividale, Ltd., Staffordshire, England.

★ **"Airjig."** Ridge Equipment Co., Fallentimber, Pa.

★ **Heavy-medium cyclones.** Roberts & Schaefer Co., Chicago, Ill.

★ **"Ty-Rocket" two-bearing screens.** W. S. Tyler Co., Cleveland, Ohio.

★ **"Hollingsworth" flotation cell.** Wellman-Lord Engineering, Inc., Lakeland, Fla.

★ **Wemco "Siebtechnik" centrifugal dryer.** Wemco Div., Western Machinery Co., San Francisco, Calif.

Maintenance and Supplies

★ **Headlight resistor.** Acme Machinery Co., Huntington, W. Va.

★ **Automatic dust - control valve.** Acme Machinery Co., Huntington, W. Va.

★ **High-pressure hose, fittings.** Aeroquip Corp., Jackson, Mich.

★ **"Spacemaker" control units.** Allis-Chalmers Mfg. Co., Milwaukee, Wis.

★ **"AM-9" chemical grout.** American Cyanamid Co., New York, N.Y.

★ **Filter aids.** American Cyanamid Co., New York, N.Y.

★ **Metal-removal torch.** Arcair Co., Lancaster, Ohio.

★ **Solid tires.** Bearcat Tire Co., Chicago Ill.

★ **"BostRon" and "Flame-out 200" belting.** Boston Woven Hose & Rubber Div., American Biltrite Rubber Co., Boston, Mass.

★ **Stronger cutter bar.** Bowdil Co., Canton, Ohio.

★ **7.5-KV multiconductor cable connector.** Brad Harrison Co., Hillside, Ill.

★ **"Thermoweld" system.** Burndy Corp., Norwalk, Conn.

★ **Electronic communication systems.** Com-Tronics, Inc., Pittsburgh, Pa.

★ **700-hp diesel engine.** Cummins Engine Co., Columbus, Ind.

★ **Dry fluid drives.** Dodge Mfg. Co., Mishawaka, Ind.

★ **Countersunk belt fasteners.** Flexible Steel Lacing Co., Chicago, Ill.

★ **Hing-type belt fasteners.** General Splice Corp., Beckley, W. Va.

★ **Air - cooled diesel engines.** Boyers Machinery & Supply Co., Boyer, Pa.; and J. & J. Coal & Equipment Co., Cleveland.

★ **Improved rigid conduit.** Kaiser Aluminum & Chemical Corp., Oakland, Calif.

★ **Winch hoists.** Lug-All Co., Haverford, Pa.

★ **Special - duty steels.** Lukens Steel Co., Coatesville, Pa.

★ **"7-Flex" wire rope.** Macwhyte Co., Kenosha, Wis.

★ **Undercutter tool.** Martindale Electric Co., Cleveland.

★ **M-S-A "Pager" telephone.** Mine Safety Appliances Co., Pittsburgh, Pa.

★ **"Hayden" belt fastener.** National Mine Service Co., Indiana, Pa.

Sonar Railroad-car loading. Sanford-Day Corp., Knoxville, Tenn.

★ **Power-shift transmissions.** Twin Disc Clutch Co., Racine, Wis.

★ **"Plainlock" couplings; "Full-Flow" fittings.** Victaulic Co. of America, Elizabeth, N.J.

★ **Silicon rectifier.** Westinghouse Electric Corp., Pittsburgh, Pa.

Manitowoc, Wis.—Manitowoc Model 4500 Vicon for shovel or dragline applications.

• **Marion Power Shovel Co.,** Marion, Ohio—Shovels and draglines.

McDowell-Wellman Cos., Cleveland, Ohio—West German bucket-wheel excavator.

Olin Mathieson Chemical Corp., East Alton, Ill.—30-step electric delay blasting caps; Super Prime primers; explosives.

• **Salem Tool Co.,** Salem, Ohio—Auger sections and drilling heads for vertical and horizontal highwall drills.

Schramm, Inc., West Chester, Pa.—Model C42 Rotadrill for making blastholes up to 6 in. and other mounted drills.

• **Security Engineering Div.,** Dresser Industries, Inc., Dallas 11, Tex.—Security high-performance, heavy-duty rock bits.

Spencer Chemical Co., Kansas City 5, Mo.—Blasting agents and supplies; pneumatic placement machine, and new Spenite booster.

• **Timken Roller Bearing Co.,** Canton 6, Ohio—Timken removable rock bits.

Varel Mfg. Co., Dallas 20, Tex.—New replaceable-cone rock bits for holes, up to 12¼-in diameter.

Vibra-Tech Engineers, Inc., Bradfordwoods, Pa.—Blasting vibration analysis.

Winter-Weiss Co., Denver 5, Colo.—Model 10-TE Portadrill for overburden or exploration.

Auger Mining

• **Joy Mfg. Co.,** Pittsburgh 22, Pa.—Compton auguers.

• **Salem Tool Co.,** Salem, Ohio—New dual-auger coal-recovery drill.

Coal Preparation

• **Allis-Chalmers Mfg. Co.,** Milwaukee 1, Wis.—Operating models of A-C Low-Head and Ripl-Flo screens, and solids-handling centrifugal pump.

American Air Filter Co., Louisville 8, Ky.—Dust collectors.

• **American Cyanamid Co.,** New York 20, N. Y.—Flocculants.

Ashland Oil & Refining Co., Ashland Ky.—Coal-treatment oils.

Barrett, Haentjens & Co., Hazleton, Pa.—Slurry pumps.

• **Bird Machine Co.,** S. Walpole, Mass.—Bird-Humboldt oscillating-screen centrifuge; Bird continuous solid-bowl

Coal Show Exhibits

centrifuge, and Bird sludge centrifuge for dewatering minus 28M material.

Bixby-Zimmer Engineering Co., Galesburg, Ill.—All types of B-Z welded rod stainless-steel screens.

Buell Engineering Co., Inc., New York 38, N. Y.—Buell classifying systems for air separation of dry materials.

• **Centrifugal & Mechanical Industries, Inc.,** St. Louis 18, Mo.—C-M-I continuous centrifugal dryer with latest improvements.

Commercial Testing & Engineering Co., Chicago 1, Ill.—Sampling and analyzing services and a new automatic plastometer.

• **Connellsville Corp.,** Connellsville, Pa.—Slot-type horizontal coke ovens.

The Deister Concentrator Co., Inc., Ft. Wayne, Ind.—Concenco 77 and SuperDuty diagonal-deck washing tables; Concenco sprays; Concenco feed distributors, and Leahy screens with and without FlexEley heaters.

• **Dorr-Oliver, Inc.,** Stamford, Conn.—FluoSolids drying system, desiltors, filters, thickeners, DorrClone cyclone classification and application of the fluid-bed dryer to perform a sizing operation at 48M.

Eimco Corp., Salt Lake City 10, Utah—Agidisc filters, thickeners.

Eriez Mfg. Co., Erie, Pa.—Permanent-magnet separating equipment; bin feeders and vibrators.

Fairmont Machinery Co., Fairmont, W. Va.—Preparation-plant design and construction; chance process.

Fuel Process Co., S. Charleston, W. Va.—Calcium chloride washers.

• **Galis Electric & Machine Co.,** Morgantown, W. Va.—Having purchased facilities of Fairmont Machinery Co. and Lecco Machinery & Engineering Co., Galis will exhibit vibrating screens and preparation-plant and materials-handling units.

Gorman-Rupp Co., Mansfield, Ohio—Pumps.

Goyne Pump Co., Ashland, Pa.—Pumps.

• **T. J. Gundlach Machine Co.,** Div of J. M. J. Industries., Belleville, Ill.—Coal crushers, including adjustable types.

• **Hendrick Mfg. Co.,** Carbondale, Pa.—Cascade screen, wedge-wire and wedge-slot screens, perforated screen of all types, including rubber-clad.

Hewitt-Robins Incorporated, Stamford, Conn.—H-R vibrating screens.

Heyl & Patterson, Inc., Pittsburgh 22, Pa.—Washing cyclones; new cyclo-cell for froth flotation; Vibroplane Reinveld dryer which virtually eliminates degradation.

• **Jeffrey Mfg. Co.,** Columbus 16, Ohio—Jig washers.

• **Joy Mfg. Co.,** Pittsburgh 22, Pa.—Joy Hazemag crushers.

Keenan Oil Co., Cincinnati 12, Ohio—New coal-spray and freezeproofing oil, a single type for any coal from any mining area.

Laboratory Equipment Corp., St. Joseph, Mich.—Leco sulfur analyzer for coal and coke and automatic coal volatile analyzer.

• **Link-Belt Co.,** Chicago 1, Ill.—New Fluid-Flo coal dryer, Straightline vibrating screens, vibrating feeders and other preparation equipment.

• **Ludlow-Saylor Wire Cloth Co.,** St. Louis 10, Mo.—Industrial woven-wire cloth and screens, showing various weaves and types of openings available.

Martin Engineering Co., Neponsit, Ill.—Hand-held vibrators and heavy-duty car and bin vibrators, including the new DSVD model.

McDowell-Wellman Cos., Cleveland, Ohio—Plant construction; ABCs scales; bulk materials-handling systems.

• **McLanahan & Stone Corp.,** Hollidaysburg, Pa.—Bantam-Buster single-roll and Black Daimond triple-roll two-stage crusher with tramp-iron relief feature.

• **McNally-Pittsburg Mfg. Corp.,** Pittsburg, Kan.—Halstrick screen and other coal-preparation equipment.

Cross Metals Plant, National Standards Co., Carbondale, Pa.—Screens.

Nordberg Mfg. Co., Milwaukee, Wis.—Screens, crushers.

Nortons-Tividale, Ltd., Tipton, England—New Norton dense-medium washing system and the Norton jig packaged plant.

• **Peterson Filters & Engineering,** Salt Lake City, Utah—Peterson filters, featuring Dual-Guide and contours scrapers.

National Iron Co., Duluth, Minn., Div. of Pettibone Mulliken Corp.

Ridge Equipment Co., Fallentimber, Pa.—Ridge Airjig; feeders; complete preparation systems.

• **Roberts & Schaefer Co.,** Div. of Thompson-Starrett Co., Inc., Chicago 6, Ill.—Dutch State Mines heavy-medium cyclones and plant design.

W. S. Tyler Co., Cleveland, Ohio—New two-bearing Ty-Rocket screen and Tyler Ro-Tap testing sieves.

• **U. S. Rubber Co.,** Mechanical Goods Div., New York 20, N. Y.—Flexible, abrasion-resistant pipe.

U. S. Stoneware, Akron 9, Ohio—Ceramic and organic lining materials for abrasion resistance in preparation-plant circuits.

Victualic Co. of America, Elizabeth, N. J.—Couplings, fittings and accessories for grooved and plain-end pipe.

• **Wedge Wire Corp.** Wellington, Ohio—wedge wire screen, featuring new Poly-Wire and WT profiles for screens.

Wellman-Lord Engineering Co., Inc., Lakeland, Fla.—New Hollingsworth flotation cell.

• **Wemco Div.,** Western Machinery Co., San Francisco 7, Calif.—New Wemco Siebtechnik centrifugal dryer; flotation and heavy-media equipment; torque-flow pumps.

Compressors, Drills, Steel and Bits

Acme Machinery Co., Williamson, W. Va.—Drill supplies.

• **Bethlehem Steel Co.,** Bethlehem, Pa.—Drill steels, including hollow types.

• **Chicago Pneumatic Tool Co.,** New York 17, N. Y.—Drill steel.

• **Davey Compressor Co.,** Kent, Ohio—Rotary portable compressors and air tools.

Firth Sterling, Inc., Pittsburgh 30, Pa.—Line of bits.

• **Joy Mfg. Co.,** Pittsburgh 22, Pa.—Drills and drilling needs.

• **Kennametal, Inc.,** Bedford, Pa.—Complete line of Kennametal mining tools.

• **Le Roi Div.,** Westinghouse Air Brake Co., Milwaukee 1, Wis.—Compressors and air tools.

• **National Mine Service Co.,** Indiana, Pa.—Drill steel, bits, augers.

• **Raybestos-Manhattan, Inc.,** Manhattan Rubber Div., Passaic, N. J.—Air hose.

Schramm, Inc., W. Chester, Pa.—Portable compressors and drills.

• **Schroeder Bros. Corp.,** McKees Rocks, Pa.—Ingersoll-Rand drilling equipment.

• **Timken Roller Bearing Co.,** Canton, Ohio—Timken rock bits.

• **U. S. Rubber Co.,** Mechanical Goods Div., New York 20, N. Y.—Air hose.

Face Preparation

Acme Machinery Co., Huntington, W. Va.—Coal drills, compressors.

• **Aeroquip Corp.,** Jackson, Mich.—Air-shooting hose.

• **Allegheny Ludlum Steel Corp.,** Detroit, Mich.—Machine bits.

• **American Brattice Cloth Corp.,** Warsaw, Ind.—Powder and tamping bags.

• **American Cyanamid Co.,** New York 20, N. Y.—Permissible explosives, detonators.

• **Atlas Powder Co.,** Wilmington 99, Del.—New permissibles, blasting supplies and accessories.

• **Austin Powder Co.,** Cleveland 13, Ohio—Machine bits.

• **Bowdil Co.,** Canton, Ohio—Chains and bit blocks for cutting machines and continuous miners; cutter bars.

• **Chicago Pneumatic Tool Co.,** New York 17, N. Y.—Coal drills.

• **Cincinnati Mine Machinery Co.,** Cincinnati 25, Ohio—Complete line of cutter chains, bars and bits.

• **I. E. du Pont de Nemours & Co.,** Wilmington 98, Del.—Du Pont explosives, including complete line of 10% salt permissibles.

• **Fairview Bit Co., Inc.,** Fairview, W. Va.—Fairview semi-automatic bit grinder.

Firth Sterling, Inc., Pittsburgh 30, Pa.—Machine bits.

• **Galis Electric & Machine Co.,** Morgantown, W. Va.—Coal drills, and underground compressors.

• **Goodman Mfg. Co.,** Chicago 9, Ill.—Type 2430 universal rubber-tired cutting machine.

• **Hercules Powder Co.,** Wilmington, Del.—Explosives.

• **Jeffrey Mfg. Co.,** Columbus 16, Ohio—Cutting machines.

• **Joy Mfg. Co.,** Pittsburgh 22, Pa.—Cutting machines, coal drills.

• **Kennametal, Inc.,** Bedford, Pa.—Bits, augers, drive sockets.

• **Long-Airdox Co.,** Div. of Marmon-Herrington Corp., Oak Hill, W. Va.—Long-Airdox Mobile Multiple Shooting systems.

McLaughlin Mfg. Co., Joliet, Ill.—Bits and tools.

• **Metallurgical Products Dept.,** General Electric Co., Detroit, Mich.—Carboloy bits.

• **National Mine Service Co.,** Indiana, Pa.—Bits and augers.

Olin Mathieson Chemical Corp., Explosives Div., East Alton, Ill.—Explosives and Armstrong air-breaking system with automatic shells.

Frank Prox Co., Inc., Terre Haute, Ind.—Cutter bars, chains, bit holders and bits.

• **Schroeder Bros. Corp.,** McKees Rocks, Pa.—Ingersoll-Rand drilling equipment.

• **Vascoloy-Ramet Corp.,** Waukegan, Ill.—Quick-change and other bits for face preparation.

Roof Control

Acme Machinery Co., Williamson, W. Va.—Roof drills and bolters and compressors.

• **American Bridge Div.,** U. S. Steel Corp., Pittsburgh 30, Pa.—Ambridge mine roof bolts and accessories.

• **Bethlehem Steel Co.,** Bethlehem, Pa.—Wedge- and shell-type mine roof bolts, mine roof ties and yieldable-arch roof supports.

• **Chicago Pneumatic Tool Co.,** New York 17, N. Y.—Self-propelled roof drills.

• **Colorado Fuel & Iron Co.,** Wickwire Spencer Steel Div., New York 22, N. Y.—Steel roof bolts.

• **J. H. Fletcher & Co.,** Huntington, W. Va.—Self-propelled roof drills.

• **Galis Electric & Machine Co.,** Morgantown, W. Va.—Roof drill, self-propelled.

• **Joy Mfg. Co.,** Pittsburgh 22, Pa.—Joy roof drills.

• **Kennametal, Inc.,** Bedford, Pa.—Roof drilling bits.

• **Le Roi Div.,** Westinghouse Air Brake Co., Milwaukee, Wis.—Stopers for roof drilling.

• **Long-Airdox Co.,** Oak Hill, W. Va.—New Type LRB roof-bolting machine.

McLaughlin Mfg. Co., Joliet, Ill.—Roof augers and tools.

• **Metallurgical Products Dept.,** General Electric Co., Detroit, Mich.—Carboloy bits.

• **Mine Safety Appliances Co.,** Pittsburgh 8, Pa.—Thru-Steel dust collection systems and DrilDust buckets.

• **Mining Progress, Inc.,** Highland Mills, N. Y.—Self-advancing hydraulic supports; steel props.

• **National Mine Service Co.,** Indiana, Pa.—Roof-bolting tools and supplies.

• **Ohio Brass Co.,** Mansfield, Ohio—O-B expansion shells and plugs.

Pattin Mfg. Co., Marietta, Ohio—Roof bolts and air-seal resins.

• **Republic Steel Corp.,** Cleveland 1, Ohio—Republic roof bolts.

Schroeder Bros. Corp., McKees Rocks, Pa.—Bantam Bolter roof bolting machine.

Stahlunion Corp., New York 1, N. Y.—Wanheim steel roof supports, including self-moving supports for longwall mining, rigid and yielding arches, yielding steel props.

Templeton Kenly & Co., Broadview, Ill.—Roof jacks.

• **Timken Roller Bearing Co.,** Canton Ohio—Roof-drilling bits.

• **Vascoloy-Ramet Corp.,** Waukegan, Ill.—Roof-drilling bits.

Youngstown Sheet & Tube Co., Youngstown, Ohio—Roof bolts.

Hoisting

Haughton Elevator Co., Div. of Tole Scale Corp., Pittsburgh 12, Pa.—AC-powered mine hoisting systems.

• **Lebus International Engineers,** Longview, Tex.—Hoist-drum regrooving services to permit use of larger, longer ropes for deeper hoisting.

Mine Cars, Shuttle Cars, Mine Locomotives, Utility Cars

• **Bethlehem Steel Co.,** Behtlehem, Pa.—Mine cars and wheels.

Differential Steel Car Co., Findlay, Ohio—Mine cars.

• **General Electric Co.,** Locomotive and Car Equipment Div., Erie 1, Pa.—Mine locomotives, including 50-ton unit.

• **Goodman Mfg. Co.,** Chicago 9, Ill.—Type 870-20 low-view shuttle car, 27 in high.

Irwin-Sensenich Corp., Irwin, Pa.—All-welded steel 4-wheel trucks; Stream-Liner mine cars and Man-Van cars; all-welded aluminum mine cars.

• **Jeffrey Mfg. Co.,** Columbus 16, Ohio—Shuttle cars and locomotives.

• **Joy Mfg. Co.,** Pittsburgh 22, Pa.—New 18SC center-hinged shuttle car with six wheels, and 20RC twin-diesel shuttle car.

• **Kersey Mfg. Co., Inc.,** Bluefield, Va.—New Big Work Horse permissible mine tractor.

• **Long-Airdox Co.,** Div. of Marmon-Herrington Co., Inc., Oak Hill, W. Va.—Rubber-tired utility cars for mine service.

National Malleable & Steel Castings Co., Cleveland 6, Ohio—Rubber load-suspension applications; Willison automatic couplers, and NC-1 car truck.

• **National Mine Service Co.,** Indiana, Pa.—ManKar personnel and utility carriers; complete series of single-motor Tor-Kar shuttle cars for AC or DC systems.

Plymouth Locomotive Works, Div. of Fate-Root-Heath Co., Plymouth, Ohio—Gasoline, diesel and diesel-electric locomotives; Plymouth exhaust conditioners.

Sanford-Day Corp., Knoxville, Tenn.—Automatic drop-bottom car made of T-1 steel.

Watt Car & Wheel Co., Barnesville, Ohio—Mine cars and car wheels.

Mine-Car Feeders, Hoists, Dumps

Columbus McKinnon Chain Corp., Tonawanda, N. Y.—Model RF-44 Ratio Feeder with folding hopper walls and adjustable wheels for greater mobility.

• **Connellsville Corp.,** Connellsville, Pa.—Skips, cages, hoists, spraggers, rotary dumps, car feeders, portable elevators. Also, slot type coke ovens.

• **Joy Mfg. Co.,** Pittsburgh 22, Pa.—Shuttle-car transfer feeders.

• **National Mine Service Co.,** Indiana, Pa.—TransFeeder belt loaders.

• **Nolan Co.,** Bowerston, Ohio—New Nolan Loadveyor, an elevating transfer unit; Portafeeder carspotters; automatic trip holders; automatic carloading stations; rotary dumps.

Sanford-Day Corp., Knoxville, Tenn.—HKI car hoists; Sonar systems for automatic control of carloading at tipples.

Schroeder Bros. Corp., McKees Rocks, Pa.—Stamler hydraulic carspotter and automatic loading station.

Track, Track Cleaners

• **American Mine Door Co.,** Canton 6, Ohio—Model 60 heavy-duty track cleaner.

• **Bethlehem Steel Co.,** Bethlehem, Pa.—Heavy-duty mine trackwork, including switch materials, guard rail, frogs, switch stands, mine rail, steel ties.

Coal Show Exhibits

• **Chicago Pneumatic Tool Co.,** New York 17, N. Y.—Pneumatic spike driver.

• **J. H. Fletcher & Co.,** Huntington 18, W. Va.—Self-propelled track tamper for low seams.

• **Le Roi Div.,** Westinghouse Air Brake Co., Milwaukee 1, Wis.—Tamper.

Osmose Wood Preserving Co. of America, Buffalo 9, N. Y.—Wood preservatives.

Thermex Metallurgical, Inc., Lakehurst, N. J.—Automatic track welding.

• **United States Steel Corp.,** Pittsburgh 30, Pa.—Trackwork and accessories.

West Elizabeth Lumber Co., W. Elizabeth, Pa.—Creosoted ties, lumber.

Man Cars and Buses, Personnel Facilities

• **Connellsville Corp.,** Connellsville, Pa.—Elevators for cleaning plants.

Irwin Sensenich Corp., Irwin, Pa.—Man-Van cars.

• **Galis Electric & Machine Co.,** Morgantown, W. Va.—Portal buses.

• **Kersey Mfg. Co.,** Bluefield, W. Va.—Rubber-tired man cars and utility cars for underground mining.

• **Lee-Norse Co.,** Charleroi, Pa.—Portal buses.

• **Long-Airdox Co.,** Div. of Marmon-Herrington Co., Inc., Oak Hill, W. Va.—Man and supply cars, self-propelled, rubber-tired.

• **National Mine Service Co.,** Indiana, Pa.—ManKars for personnel transportation and utility uses.

Mine Conveyors, Belt, Accessories

Automatic Vulcanizers Corp., New York 13, N. Y.—Cold-cure belt repairs.

• **Boston Woven Hose & Rubber Div.,** American Biltrite Rubber Co., Boston 3, Mass.—BostRon and Flameout 200 conveyor belting, both new.

• **Conveyor Belt Service, Inc.,** Duluth, Minn.—Belt repair servies.

Ensign Electric Co., Huntington, W. Va.—Centrifugal switches.

Eriez Mfg. Co., Erie, Pa.—Magnetic pulleys.

• **Flexible Steel Lacing Co.,** Chicago 44, Ill.—Flexco plate-type and hinged belt fasteners and countersinking tools (for belts having heavy rubber covers); Alligator belt lacing and wide-belt cutters; Turtle belt fasteners for quick repairs, and Far-Pul belt clamps to aid in belt installation.

• **General Splice Corp.,** South Norwalk, Conn.—Belt splices.

• **Goodman Mfg. Co.,** Chicago 9, Ill. drive head section with adjustable-height discharge boom and new tail section for—Ropebelt conveyor with new tandem-shuttle-car or conveyor loading.

• **B. F. Goodrich Co.,** Akron, Ohio—Caricoal Nylock conveyor belting of fire-resistant construction.

Goodyear Tire & Rubber Co., Akron 16, Ohio—Full line of conveyor belting.

Heintz Mfg. Co., Cleveland 35, Ohio—Portable electric vulcanizing machines.

Hewitt-Robins, Incorporated, Stamford, Conn.—Conveyors and conveyor belting.

Hughes Tyler Corp., Littleton, Colo.—Parts and components for belt conveyors.

Irwin-Sensenich Corp., Irwin, Pa.—Huwood-Irwin G-40 belt conveyor.

Interstate Equipment Corp., Elizabeth 4, N. J.—Automatic aerial tramways.

• **Jeffrey Mfg. Co.,** Columbus 16, Ohio—Ropeframe belt-conveyor components; bridge conveyor.

• **Joy Mfg. Co.,** Pittsburgh 22, Pa.—New three-roll steel idlers and belt conveyor components, including ropeframe constructions.

• **Link-Belt Co.,** Chicago 1, Ill.—Deep-trough 35-deg belt conveyor idlers from 48 to 72 in wide.

• **Long-Airdox Co.,** Div. of Marmon-Herrington Co., Oak Hill, W. Va.—Lo-Rope belt conveyor and all components of conveying systems for "Full-Dimension" mining.

• **McNally-Pittsburg Mfg. Corp.,** Pittsburgh, Kan.—Cradle idler for conveyor belts.

Mining Progress, Inc., Highland Mills N. Y.—Panzer conveyors.

• **National Mine Service Co.,** Indiana, Pa.—Scandura PVC conveyor belting; Clarkson Red Bird conveyor chain; Hayden Zipper belt fasteners.

Rema-Tech, Inc., New York 16, N. Y.—Belt splicing systems and equipment.

• **Thermoid Div.,** H. K. Porter Co., Trenton, N. J.—Coledge conveyor belt.

• **Raybestos-Manhattan, Inc.,** Manhattan Rubber Div., Passaic, N. J.—Coalmover belting; Wedlock splices, and Ray-Man belting for 45-deg idlers.

Stahlunion Corp., New York 1, N. Y.—Eickhoff conveyor systems, including belt, steel plate and chain conveyors.

• **United States Rubber Co.,** New York 20, N. Y.—Conveyor belting.

West Virginia Belt Sales, Inc., Mount Hope, W. Va.—Ruslon PVC belting; pulleys and idlers with vulcanized rubber and neoprene lagging.

Pumping and Drainage

Barrett Haentjens & Co., Hazleton, Pa.—Hazleton pump and auxiliaries.

Boyers Machinery & Supply Co., Boyers, Pa.—Gorman-Rupp 4-in pump coupled to Model SL-3 Lister air-cooled diesel engine which can be hand-started in cold weather.

Flood City Brass & Electric Co., Johnstown, Pa.—Flood City and Austin-Brownie pumps and parts.

• **B. F. Goodrich Co.,** Akron, Ohio—Rigid Koroseal pipe and fittings.

Gorman-Rupp Co., Mansfield, Ohio—Line of pumps.

Goyne Pump Co., Ashland, Pa.—Goyne pumps.

Megator Corp., Pittsburgh 12, Pa.—Megator pumps.

• **National Mine Service Co.,** Indiana, Pa.—Pipe couplings.

• **Raybestos-Manhattan, Inc.,** Manhattan Rubber Div., Passaic, N. J.—Condor flexible pipe and rubber-lined pipe; Homoflex water hose.

A. O. Smith Corp., Anaheim, Calif.—Portable, submersible pumps.

• **U. S. Rubber Co.,** Mechanical Goods Div., New York 20, N. Y.—Hose and fittings; plastic pipe; packings.

• **United States Steel Corp.,** National Tube Div., Pittsburgh 30, Pa.—Polyethylene pipe.

Victaulic Co. of America, Elizabeth, N. J.—Couplings, fittings, tools and accessories for grooved and plain-end pipe, including Plainlock method for utilizing full wall thickness of pipe in corrosive service. Also Full-Flow fittings and directional changes.

Youngstown Sheet & Tube Co., Youngstown, Ohio—Piping and tubing.

Ventilation

• **American Brattice Cloth Corp.,** Warsaw, Ind.—Brattice cloth and ventilation tubing.

• **American Mine Door Co.,** Canton 6, Ohio—Recent developments in mine doors.

• **Femco, Inc.,** Irwin, Pa.—Remote-control fan monitors.

• **Jeffrey Mfg. Co.,** Columbus 16, Ohio—Mine fans and blowers.

• **Joy Mfg. Co.,** Pittsburgh 22, Pa.—Axivane fans; Microdyne dust collectors.

Tractors, Tractor Loaders, Bulldozers, Graders

• **Allis-Chalmers Mfg. Co.,** Tractor Group, Milwaukee, Wis.—TL-30 tractor-loader, and HD-21 diesel-powered crawler tractor with U bulldozer.

• **Caterpillar Tractor Co.,** Peoria, Ill.—D-9 with U blade; 2 ¾-yd Traxcavator; Model 630 wheel tractor.

• **Euclid Div.,** General Motors Corp.,

Cleveland 17, Ohio—New TS-14 Little Twinscraper; two Model C-6 crawler tractors, one with attachments, the other stripped.

Frank G. Hough Co., Libertyville, Ill.—Payloaders, Paydozers, Drott Four-in-One buckets.

• **International Harvester Co.**, Chicago 1, Ill.—International TD-30 crawler tractor; Drott Four-in-One machines.

Oliver Corp., Chicago 6, Ill.—Crawler-type bulldozer and front-end loaders.

LeTourneau, Inc., R. G., Longview, Tex.—Earthmoving equipment.

LeTourneau-Westinghouse Co., Peoria, Ill.—New Model C Tournatractor with hydraulically-operated attachments.

Trucks, Engines, Torque Converters, Generators

• **Allis-Chalmers Mfg. Co.**, Milwaukee, Wis.—200-KW generator set; off-highway diesel engines Models Nos. 21000 and 11000.

Allison Div., General Motors Corp., Indianapolis 6, Ind.—Allison engines.

• **Caterpillar Tractor Co.**, Peoria, Ill.—Model 1673 truck engine; new 950-hp, 12-cylinder, V-type industrial engine; D-330 engine, all diesels.

• **Cummins Engine Co., Inc.**, Columbus, Ind.—Diesel engines and auxiliaries.

• **Euclid Div.**, General Motors Corp., Cleveland 17, Ohio—Euclid haulage units.

Heil Co., Tec Div., Cleveland, Ohio—Dump trailers for high-capacity haulage.

• **International Harvester Co.**, Chicago 1, Ill.—Model 95 Payhauler; Model UV-549, 8-cylinder engine.

J. & J. Coal & Equipment Co., Cleveland 26, Ohio—Lister air-cooled diesel engines, from 3 to 72 hp.

• **KW-Dart Truck Co.**, Kansas City 41, Mo.—New 120-yd (struck) coal hauler powered by 700-hp diesel.

LeTourneau-Westinghouse Co., Peoria, Ill.—New GN-6V-71 diesel engine.

Willys Motors, Inc., Toledo 1, Ohio—Utility vehicles.

Motors and Controls, Conversion Units Batteries

• **Allis-Chalmers Mfg. Co.**, Milwaukee, Wis.—New SpaceMaker high-voltage control; motor-control centers; reduced-voltage starters; electric motors.

Louis Allis Co., Milwaukee, Wis.—Complete line of AC and DC motors and controls, including AC shuttle-car motor.

• **Cheatham Electric Switching Device Co., Louisville 9, Ky.**—Cheatham controls and devices.

Ensign Electric & Mfg. Co., Huntington, W. Va.—Portable underground transformers; motor starters, contactors, controls, switches; receptacles and plugs for AC systems.

• **General Electric Co.**, Schenectady 5, N. Y.—Rectifier cars; power equipment; motors and motor controls.

Gould-National Batteries, Inc., Trenton 7, N. J.—Complete range of batteries and chargers with selection and servicing data.

• **Ohio Brass Co.**, Mansfield, Ohio—Motor starters; circuit interrupters; lightning arresters; capacitors.

• **Westinghouse Electric Corp.**, Pittsburgh 30, Pa.—Portable rectifiers; full line of AC and DC motors; mine power centers; hoist controls; insulation; new silicon power rectifier.

Electrical Wire, Cable, Bonds, Splices, Ground Detectors

• **Anaconda Wire & Cable Co.**, New York 4, N. Y.—Shovel, Type G, mining-machine, shuttle-car and mine-power cables.

Burndy Corp., Norwalk, Conn.—Terminators, connectors and fittings; Hydent compression connectors; Thermoweld power-less welding; cable-pulling compounds.

• **Collyer Insulated Wire Co.**, Pawtucket, R. I.—Portable cables for shuttle cars, mining machines.

Ensign Electric & Mfg. Co., Huntington, W. Va.—Electrical equipment for AC mining.

Flood City Brass & Electric Co., Johnstown, Pa.—Line material and electrical specialties.

General Cable Corp., New York 17, N. Y.—Heavy-duty mining cables in full range of capacities.

Brad Harrison Co., Hillside, Ill.—New 7.5-KV multiconductor cable connector.

• **Joy Mfg. Co.**, Pittsburgh 22, Pa.—Cable connectors; ground indicators; Lectronic Sentry; new FlexTite push-button stations.

Kasier Aluminum & Chemical Corp., Oakland 12, Calif.—Mining-machine trailing cables; power cables; aluminum cable; portable cords; aluminum conduit.

Martindale Electric Co., Cleveland, Ohio—Electrical testing instruments.

• **National Electric Div., H. K. Porter Co., Inc.**, Pittsburgh 19, Pa.—Indestructo mining-machine cables.

• **National Mine Service Co., Indiana**, Pa.—Ground detectors and cable service.

• **Ohio Brass Co.**, Mansfield, Ohio—Insulators and hardware for power systems; cable-fault locators; taps and ground clamps; rail bonds; line materials.

• **Okonite Co.**, Passaic, N. J.—Cables for underground and open-pit mining, both AC and DC, and Okonite insulating tapes.

• **PLM Products., Inc.**, Cleveland 11, Ohio—7,500-V cable coupler and new three-way skid.

• **Penn Machine Co.**, Johnstown, Pa.—Welded rail bonds.

• **John A. Roeblings' Sons Div.**, Colorado Fuel & Iron Co., Trenton, N. J.—Power, control and mining-machine cables for mining.

Rome Cable Div., Aluminum Co. of America., Rome, N. Y.—Lead-molded, neoprene-jacketed portable cord; high-voltage power cable.

Simplex Wire & Cable Co., Cambridge, Mass.—Portable and power cables.

• **U. S. Rubber Co.**, Mechanical Goods Div., New York 20, N. Y.—Friction tapes, splicing compound, plastic tape.

• **U. S. Steel Corp.**, American Steel & Wire Div., Cleveland—Amerclad cords and cables for mining service.

Power Transmission

• **Allis-Chalmers Mfg. Co.**, Milwaukee 1, Wis.—Shaftex speed reducers; Vari-Tex speed changers; Time-Tex drives.

• **Boston Woven Hose & Rubber Div.**, American Biltrite Rubber Co., Boston 3, Mass.—V-belts.

• **Dodge Mfg. Corp.**, Mishawaka, Ind.—Para-flex cushion couplings; Flexidyne dry fluid drives and couplings; torque-arm speed reducers; Dyna-V belt drives; Taper-Lock sprockets and roller chain.

Hewitt-Robins, Incorporated, Stamford, Conn.—Speed reducers.

• **B. F. Goodrich Co.**, Akron, Ohio—V-belts for power transmission.

• **Link-Belt Co.**, Chicago 1, Ill.—Chain drives and sprockets, and other power transmission equipment.

• **Raybestos-Manhattan, Inc.**, Passaic, N. J.—New Poly-V drive with matched-rib pulleys and belts.

Twin Disc Clutch Co., Racine, Wis.—New TA-51-2000 power-shift transmission.

• **United States Rubber Co.**, New York 20, N. Y.—Power-transmission, timing and reinforced belts.

• **Westinghouse Electric Corp.**, Pittsburgh 30, Pa.—Moduline speed-reducing equipment.

Coal Show Exhibits

Bearings

Bearing Service Co., Pittsburgh 13, Pa.—Full line of bearings.

• **Dodge Mfg. Corp.**, Mishawaka, Ind.—Full line of industrial mounted bearings.

• **Federal-Mogul Service**, Federal-Mogul-Bower Bearings, Inc., Detroit, Mich.—tapered and straight roller bearings; ball bearings; oil seals; "O" rings.

• **Timken Roller Bearing Co.**, Canton 6, Ohio—Timken tapered roller bearings for the mining industry.

Hydraulics

• **Aeroquip Corp.**, Jackson, Mich.—Complete line of hydraulic couplings and fittings, and machines for cutting hose and assembling hoses and fittings.

Flood City Brass & Electric Co., Johnstown, Pa.—Hydraulic cylinder for locomotive brakes.

• **Schroeder Bros. Corp.**, McKees Rocks, Pa.—Hydraulic testing and maintenance equipment; Micronic line filters.

Weatherhead Co., Ft. Wayne, Ind.—Flared and flareless fittings; hose-swaging machines; fittings for plastic tubing, and reusable and permanent hose ends.

Wire Rope, Steel, Steel Products

American Chain & Cable Co., Bridgeport 2, Conn.—VHS high-strength wire rope.

• **Bethlehem Steel Co.**, Bethlehem, Pa.—Wire rope and slings for mine purposes; rail; steel sections.

Broderick & Bascom Rope Co., St. Louis 15, Mo.—Powersteel wire rope and a full range of wire ropes with applications.

• **Colorado Fuel & Iron Co.**, New York 22, N.Y.—Wickwire Double Gray extra high strength rope; Roebling Blue Center, Royal Blue and Herringbone ropes.

Ford Steel Co., St. Louis 10, Mo.—Mangalloy and Wearalloy steels; round, square and flat bars; repoints for dragline teeth; welding electrodes.

Great Lakes Steel Corp., Ecorse 29, Mich.—X-A-R abrasion-resistant steel.

Lukens Steel Co., Coatesville, Pa.—Lukens T-1 stainless-clad steels.

Macwhyte Wire Rope Co., Kenosha, Wis.—Wire rope, slings, cable, wire-rope assemblies.

• **Timken Roller Bearing Co.**, Canton 6, Ohio—Timken alloy steels and seamless steel tubing.

• **Union Wire Rope**, Armco Steel Corp., Kansas City 26, Mo.—Tuffy slings and wire rope for mining applications.

• **United States Steel Corp.**, Pittsburgh 30, Pa.—Man-Ten, Cor-Ten, Tri-Ten, and T-1 steels; stainless steels; Amerclad wire rope.

Werco Steel Co., Chicago, Ill.—Tornado impact crusher; woven-wire and perforated-plate screens; alloy steel castings.

Wire Rope Corp. of America, Inc., St. Joseph, Mo.—Slings and swaged assemblies for the mining industry.

Lubrication, Hydraulic Fluids

Ashland Oil & Refining Co., Ashland, Ky.—Industrial and mining lubricants.

American Oil Co., Chicago 80, Ill.—Heavy-duty motor oils, diesel fuel, multipurpose additive-type circulating and hydraulic oils, Amolind leaded lubricant No. 12.

Cities Service Oil Co., New York 5, N.Y.—mining oils and lubricants.

Gulf Oil Corp., Pittsburgh 30, Pa.—Fire-resistant hydraulic fluid, mining lubricants, Gulf HD grease.

Humble Oil & Refining Co., New York, N. Y.—Mining lubricants.

Keenan Oil Co., Cincinnati, Ohio—Coal-spray oils.

Mobil Oil Co., New York 17, N.Y.—Fire-resistant hydraulic fluid and lubricants.

Pure Oil Co., Pittsburgh 24, Pa.—Mining machinery lubricants and Puro fire-resistant hydraulic fluid.

• **Shell Oil Co.**, New York 20, N.Y.—Full line of oils and greases and fire-resistant hydraulic fluid.

Standard Oil Co. (Ohio), Cleveland—Industrial lubricants.

Sun Oil Co., Philadelphia 3, Pa.—Lubricants for coal mining.

• **Texaco, Inc.**, New York 17, N.Y.—Exhibit of industrial lubricants based on the theme "Organized Lubrication."

Whitmore Mfg. Co., Cleveland 15, Ohio—Whitmore lubricants for special requirements.

New, Renewal Parts

Acme Machinery Co., Huntington, W. Va.—Conveyor chain for continuous miners and loading machines.

• **Aeroquip Corp.**, Jackson, Mich.—Truck air-brake hose.

Cooke-Wilson Electric Supply Co., Pittsburgh 3, Pa.—Gears, pinions, sprockets and other replacement parts.

• **ESCO Corp.**, Portland 10, Ore.—Esco bucket teeth, cutting edges, and dragline rigging and replacement parts.

Flood City Brass & Electric Co., Johnstown, Pa.—Pumps and parts; replacements for all types of mining machinery; electrical specialties.

• **Goodman Mfg. Co.**, Chicago 9, Ill.—Goodman replacement parts.

Helwig Carbon Products, Inc., Milwaukee 19, Wis.—Brushes, carbon products.

• **Jeffrey Mfg. Co.**, Columbus 16, Ohio—Jeffrey replacement parts.

• **Joy Mfg. Co.**, Pittsburgh 22, Pa.—Joy replacement parts.

Kensington Steel Div., Poor & Co., Chicago 28, Ill.—Sprocket rims and grouser plates for crawler tractors.

Mining Machine Parts, Inc., Cleveland 14, Ohio—Electrical and mechanical replacement parts and conveyor chain.

• **National Mine Service Co.**, Indiana, Pa.—Clarkson Redbird conveyor chain.

Ohio Carbon Co., Cleveland 11, Ohio—Replacement brushes for rotating electrical equipment. Burnishing tools for commutator and ring cleaning.

• **Penn Machine Co.**, Johnstown, Pa.—Replacement parts for mining machines.

• **Tool Steel Gear & Pinion Co.**, Cincinnati 16, Ohio—Hardened gears, pinions, sprockets, sheaves for mining machines, excavators, locomotives.

Wellman, S. K., Bedford, Ohio—Brake blocks, bands, and other friction materials.

Westinghouse Electric Corp., Pittsburgh, Pa.—Westinghouse replacement parts and services.

Maintenance

American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill.—Amsco hardfacing rods.

Arcair Co., Lancaster, Ohio—Arcair metal-removal process and equipment, manual and automatic.

Boyers Machinery & Supply Co., Boyers, Pa.—Hobart welder driven by Lister air-cooled diesel engine.

Electric Machine & Supply Co., Clarksburg, W. Va.—Mining-machine rebuilding.

• **Flexible Steel Lacing Co.**, Chicago 44, Ill.—Tools and fasteners for belt-conveyor maintenance.

• **Harnischfeger Corp.**, Milwaukee 46, Wis.—Welding machines.

• **Kennametal, Inc.**, Bedford, Pa.—Kenface hardfacing materials; Kendex metal cutting tools; wear parts, and bit-maintenance tools.

Lug-All Co., Haverford, Pa.—Rapid-lowering series of Lug-All winch hoists.

Martindale Electric Co., Cleveland 7, Ohio—New industrial undercutter and other electrical maintenance tools and meters.

McKay Co., Pittsburgh, Pa.—Welding supplies, specialty electrodes.

• **National Electric Coil Div.**, McGraw-Edison Co., Columbus 16, Ohio—Oil- and moisture-resistant insulation for motors and generators.

• **National Mine Service Co.**, Indiana, Pa.—Panel and machine rebuilding.

Ohio Carbon Co., Cleveland 11, Ohio—Burnishing tools for commutators and rings.

Proto Tool Co., Pittsburgh, Pa.—Complete line of hand tools for mining, including pullers, etc.

Rust-Oleum Corp., Evanston, Ill.—Rust-preventive coatings.

Stratoflex, Inc., Fort Worth 14, Tex.—Reusable hydraulic fittings.

Templeton-Kenly & Co., Broadview, Ill.—Full line of hydraulic jacks and rams.

• **Union Wire Rope**, Armco Steel Corp., Kansas City 26, Mo.—Overhead cranes.

U.S. Stoneware, Akron 3, Ohio—Plastic and ceramic lining materials.

Weatherhead Co., Ft. Wayne, Ind.—Hydraulic fittings, assemblies and tools.

Safety, Mine Lighting, Communication

• **American Brattice Cloth Corp.**, Warsaw, Ind.—Trolley guard.

• **American Mine Door Co.**, Canton 6, Ohio—Little Chief self-propelled rock-duster.

• **Boston Woven Hose & Rubber Div.**, American Biltrite Rubber Co., Boston 3, Mass.—Boston fire hose.

Com-Tronics, Inc., Pittsburgh 21, Pa.—Transistorized paging telephone system; modern transistorized control system; completely transistorized and miniaturized FM radio-frequency carrier unit.

• **Femco, Inc.**, Irwin, Pa.—Programming and remote control equipment; electronic alarms and communication systems.

• **Galis Electric & Machine Co.**, Morgantown, W. Va.—Rock duster.

• **General Electric Co.**, Schenectady 5, N.Y.—Closed-circuit TV; two-way radio; communications equipment.

Goodyear Tire & Rubber Co., Akron, Ohio—Diamond brand fire hose.

• **B. F. Goodrich Co.**, Akron, Ohio—Fire hose, gloves, clothing, boots, shoes.

Martindale Electric Co., Cleveland 7, Ohio—Protective masks and refills; eye protection.

• **Mine Safety Appliances Co.**, Pittsburgh 8, Pa.—Edison electric cap lamps with automatic charging; MSA fluorescent mine lighting system; mine-communication systems including MinePhone and an all-new paging system. New Airslide rockduster with 1 ton hopper and a transfer conveyor for rock dust. Complete line of personal protective equipment, breathing apparatus, Self-Rescuers, protective hats, safety clothing, and a new line of eye and face protective equipment.

Motorola Communications & Electronics, Inc., Chicago 51, Ill.—Closed-circuit TV; two-way radio.

• **National Mine Service Co.**, Indiana, Pa.—Wheat electric cap lamps; Riken methane indicators; safety and first aid equipment.

• **Raybestos-Manhattan, Inc.**, Manhattan Rubber Div., Passaic, N.J.—Safety trolley-wire guard; fire hose.

Tires

Bearcat Tire Co., Chicago 9, Ill.—Bearcat Grizzly solid tires.

• **U.S. Rubber Co.**, New York 20, N.Y.—U.S. Royal tires, including Mine-Cushion, a solid tire.

Mining Specialties, Services

Coal Age, New York 36, N.Y.—Publishing services for the coal industry, including those of its affiliates, Keystone Coal Buyers Manual and Keystone Coal Mine Directory.

Long Mining Corp., Houston, Tex.—Consulting engineers.

Mechanization, Inc., Washington 4, D.C.—Coal-mining and utilization publications.

Mining Congress Journal, Washington, D.C.—Publishing services for the coal, metallic and non-metallic mining industries.

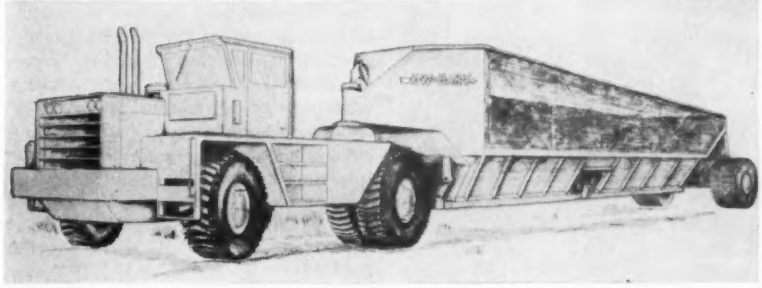
Mining & Quarrying, Harrison, N. Y.—Mining equipment publication.

Parkersburg Rig & &Reel Co., Parkersburg, W. Va.—Pre-engineered steel and aluminum buildings.

Coal Show New Products Preview

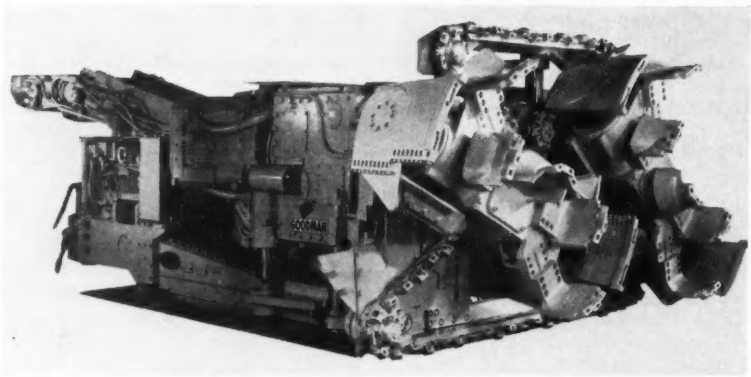
1961 Equipment, Supplies

LAST UNTIL 1964—The next Coal Show is in 1964—three years away instead of two as in the past. That's an extra reason for planning to attend this year.



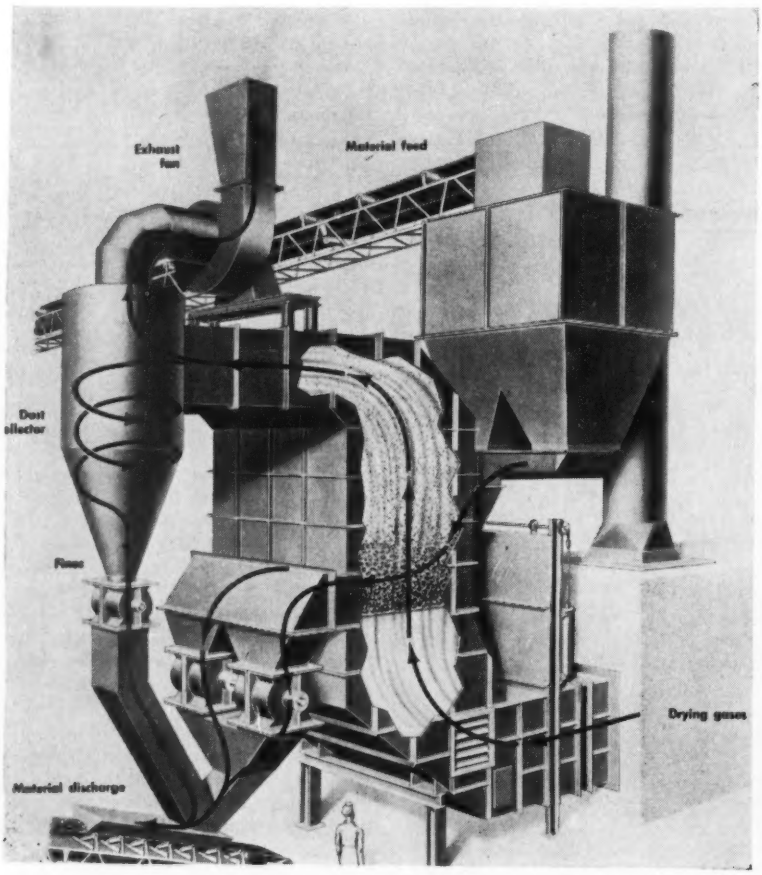
Biggest Hauler

Scheduled for its first showing at the AMC Coal Show is the 120-cu yd (struck) coal hauler built by KW-Dart Truck Co., Kansas City, Mo., and capable of hauling from 100 to 110 tons. Outstanding features of the tractor unit are a 700-hp diesel engine, triple-reduction planetary driving axle, high-strength, variable-section alloy frame and an extra-wide one-man cab. Three choices of transmission are available. The trailer body is designed to save weight and increase strength through the use of expanded-metal sides and high-alloy slope plates. Other features are low center of gravity, and universal type hitch for full turn and pivot.



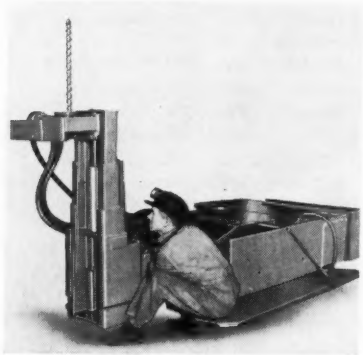
Continuous Boring Machine

The Type 428 Borer, by Goodman Mfg. Co., Chicago 9, is a single-pass machine for full-face continuous mining. Mining height is variable between 6 and 7½ ft, rated capacity is 8 tpm and its mobility suits it to development work or room-and-pillar recovery. All machine movements are powered by two 250-hp mine-duty motors, AC or DC. Precise hydraulic control of the height range permits mining in a seam of varying thickness, solves the problem of starting crosscuts, room work and pillar recovery from roof-bolted places. The variable mining height also is an advantage in areas where the bottom tends to heave. The 428 mines a bore from 11½ to 13 ft wide with ample room at sides for the operator and with a flat bottom for a good roadway. The sides of the bore are arched for strong roof support. Goodman will introduce a new low-vein continuous number also, providing full details at the show.



Roof Drills

With a 24-in overall height, the new DBE roof-control drill now being supplied by J. H. Fletcher & Co., Huntington 18, W. Va., has a 42-in-high-thrust feed and a four-wheel-traction-type chassis. The operator's controls and platform are located, the company notes, so that bolting can be performed in the lowest coal without the operator leaving the machine. Compact design results in a width of 56 in and a length of 9 ft 3 in.



The company also offers a new high-capacity heavy-duty swinging-boom roof-control drill, incorporating the latest long-feed Fletcher mast on the boom, which also slides in and out 9 ft. Three rows of three bolts each, or two rows of four bolts each, may be installed without moving the machine frame. Greatly increased bolting rates, as well as improved operator safety, are said to result from this new flexibility of positioning. The 4-wheeled full-power chassis is described as unusually rugged and stable. Replacement of mast hoses by sliding tubes minimizes maintenance.

New Fluidized-Bed Coal Dryer

Participation of Link-Belt Co., Chicago 1, Ill., in the 1961 Coal Show will be highlighted by the company's new Fluid-Flo coal dryer. The new unit, with no moving parts, is low in maintenance, has high thermal efficiency and can process materials continuously. A primary safety feature is fail-safe control of a guillotine gate which by-passes drying gases to a stack in the event of excessive temperatures in the drying zone. A feature article on the first industry application of the Fluid-Flo is scheduled for publication in the May, 1961 issue of *Coal Age*.

85-Yd Dragline

Feature of the exhibit of the Marion Power Shovel Co., Marion, Ohio, will be its new Type 8800 walking dragline, being built for the Peabody Coal Co. For details see cover picture and specifications on p 26 of this issue.

Paging System

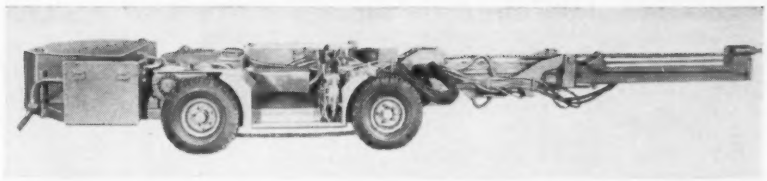
A new transistorized unit, using existing telephone lines, may be used for paging or private communications, says Mine Safety Appliances Co., Pittsburgh 8, of its new M-S-A Pager. Batteries supply 24 V for paging or 12 V for talking. The complete unit is housed in a compact aluminum case and weighs 25 lb. Easy installation and simplified maintenance are outstanding features the company states.

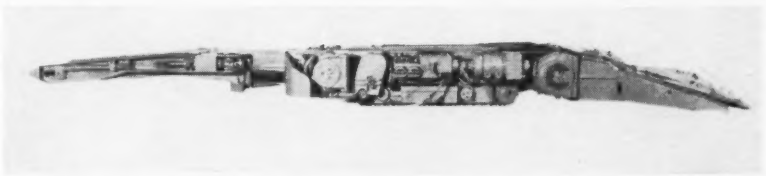
Auger Miner

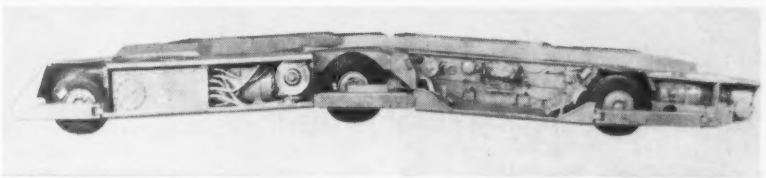
A height of 20½ in is one feature of the new 100 L auger-type continuous miner developed by the Jeffrey Mfg. Co., Columbus 16, Ohio. Benefits stressed by Jeffrey include high tonnage per man with a low initial investment cost. Jeffrey also offers with the 100 L the 94 L bridge conveyor especially designed to work with the auger unit in seams as low as 26 in. It has a 4-wheeled dolly at the discharge end riding on a flanged conveyor pan.

Heavy-Medium Cyclones

For fine-coal cleaning, Roberts & Schaefer Co., Chicago 6, offers the Dutch State Mines heavy-medium cyclone. "The heavy-medium cyclone wash ing system cleans fine coal cleaner than by any other method," the company states. "You have positive control and laboratory efficiency on a production scale."





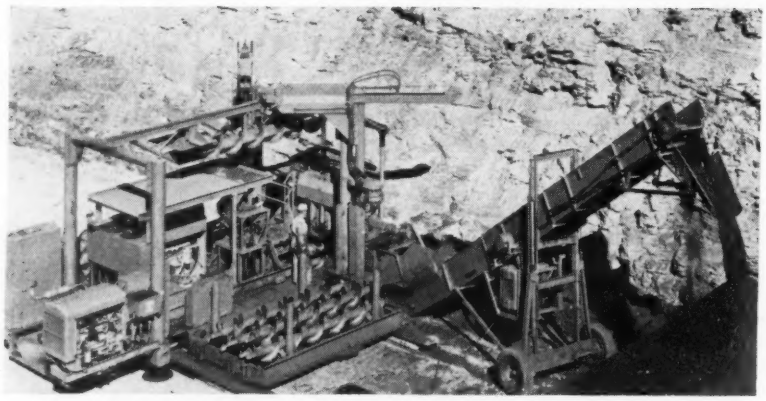


Conventional Team for Low-Seam Mining

Joy Mfg. Co., Pittsburgh 22, will introduce at the Coal Show four new machines for conventional mining in low coal. Included are the Joy 16-RB bottom cutter, CD-61 face drill, 14BU-10 loading machine and 18-SC hinged shuttlecar. All are available in 24-in-high models. The CD-61 booms wings 185 deg, enabling the single operator to drill rib holes with the centerline of the machine parallel to room line. The loading machine has a rated capacity of 10-12 tpm, with unitized design contributing to ease of maintenance. The low 18-SC shuttle car has a capacity of better than 3 tons.

Motorized Wheels on Hauler

Locomotive and Car Equipment Dept., General Electric Co., Erie, Pa., will stress the advantages of repowering off-highway vehicles with GE's motorized wheel. The wheel utilizes a traction motor mounted in the wheel rim, thus eliminating transmissions, axles, differentials, and downtime, the company explains. It is available as original equipment or for repowering.



New Dual Recovery Auger

Coal Augering is now substantially faster through the use of hydraulic components on Salem Tool Co.'s new dual-auger machine which will improve operations in three ways:

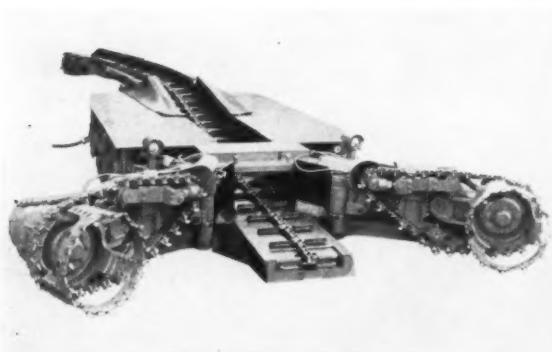
1. Increase rate of profitable production to meet competitive markets.

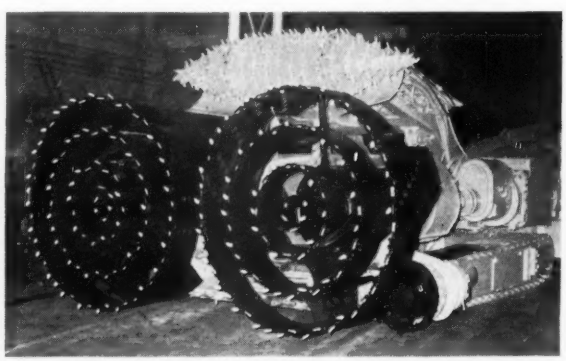
2. Provide a practical method to mine low-seam coal which presently cannot be mined at a profitable rate.

3. Provide a method of mining which will recover a higher percentage of available coal, says the sugar manufacturer.

Salem Tool Co., Salem, Ohio, has developed a 45-ton high-speed, all-hydraulic, self-propelled dual auger which, in recent tests run by a 3-man crew, mined an average of 300 tons of coal per 8-hr shift using twin 18-in augers. Design of the machine permits use of auger sizes of 18 through 30 in in diameter. The machine was able to bore a double hole, 150 ft deep, remove and store augers in machine racks, and move to the next position ready to bore again—a complete cycle in 38 min.

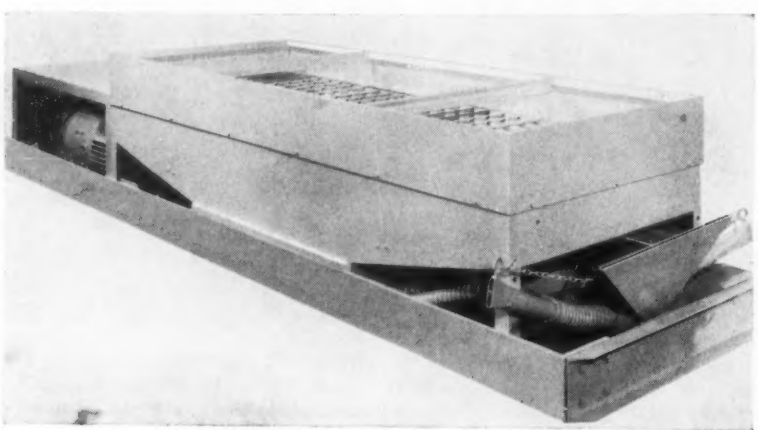
During this period, the machine bored a 150-ft hole in a vein that was only 3 in thicker than the diameter of the hole cut, and the augers remained in the vein during entire augering operation. This is made possible through a new auger rotation method—rotating each auger in an opposite direction, thereby eliminating the problem of one cutting head "climbing over" the other. By rotating the augers in opposite directions, loose coal is conveyed back on each individual auger rather than forcing coal from one head into the other auger string.





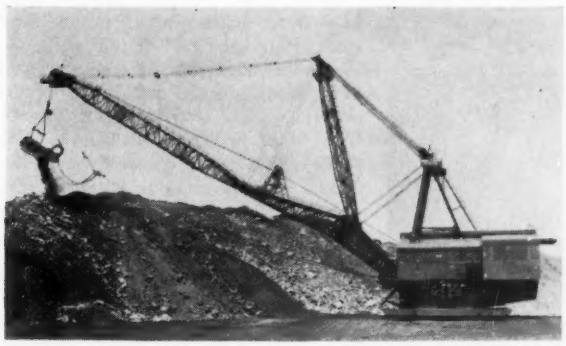
Boring and Swing-Head Continuous Miners

The Joy CU-42 Compton Miner (left) is a 30-in-high machine for operation in 36- to 54-in seams. Extended arms swing together, driving barrel-type cutting heads in an arc through the coal. Maximum production is 3 tpm, including a large proportion of lump sizes. The Joy CU-61 Compton Miner (right) is a boring-type machine for 6- to 10-ft seams. Twin heads cut in a smooth, uninterrupted arc. This circular cutting principle permits cutting of sulfur or other intrusions without bit damage or excessive bit wear, says Jay Mfg. Co., Pittsburgh 22, Pa.



Bulk Duster

M-S-A Airslide rock dust distributor is a compact, efficient distributor designed for use in shuttle cars or track-mounted supply cars. Dust can be applied to mine ribs and roof six times faster than before with one-third the labor. Standard length of the distributor is 13 ft and standard width 37 in. Five different heights are available to accommodate capacities of from 1,000 to 4,000 lb of rock dust. Discharge is at a rate of 600 lb per min through a nozzle assembly or 12 ft of 4-in hose. Quick attachment can be made to shuttle-car power take-off, says Mine Safety Appliances Co.



Excavators

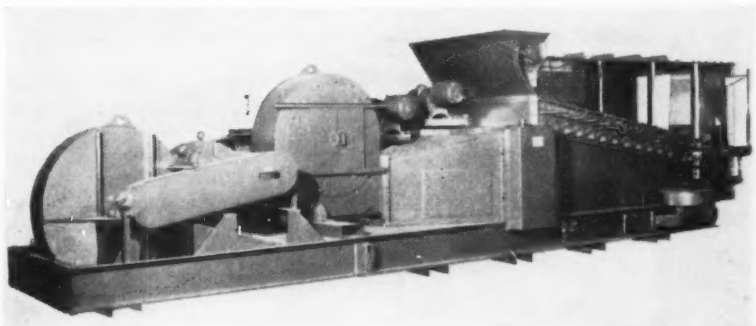
Major new design features enable the new Model 1250-W walking dragline built by the Bucyrus-Erie Co., So. Milwaukee, Wis., to handle larger quantities of material at greater boom lengths. The unit illustrated is swinging a 35-yd bucket on a 225-ft boom.

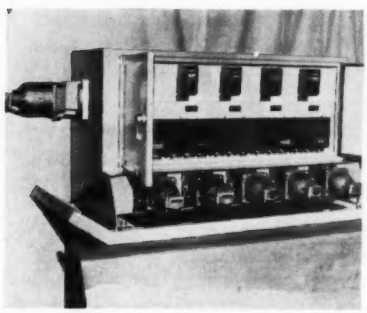
New shovels developed by Bucyrus-Erie include the 270-B, employing 15- to 18-cu yd dippers. Boom lengths of up to 100 ft can be accommodated. Along with an elevated full-vision operator's compartment, the shovel includes, according to the company, a new variable static-control system employing magnetic amplifiers with no moving parts for trouble-free instant-response operation, unlimited no-load speed selection within the speed range of the system, constant load speed up the torque limit, control of drive speed, and high available stalled bail pull in all operating points.

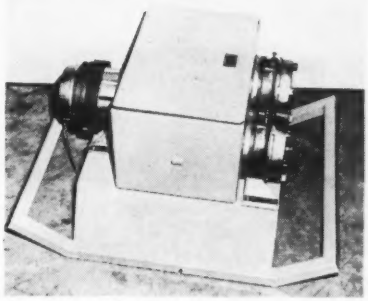
These two units are part of a group including six others: Model 210-B 9-cu yd dragline, 90-cu yd Model 1850-B stripping shovel, 18-cu yd Model 480-W walking dragline, Bucyrus-Erie wheel excavators, Model 61-R blasthole drill and the 115-cu yd Model 3850-B shovel now under construction.

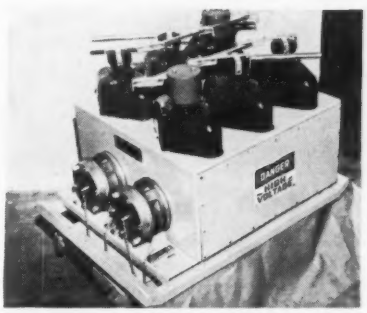
Dry Separator

Offered for dry cleaning ⅝x0 coal, the Airjig developed by Ridge Equipment Co., Fallentimber, Pa., is said to perform efficiently even where the feed contains up to 8% moisture. With everything mounted on a unit base, the machine is easily transported on one truck. It is available in three standard models in capacities from 35 to 75 tph.







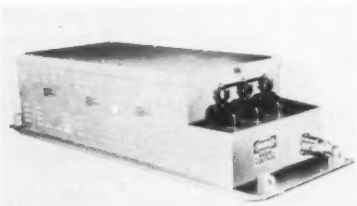


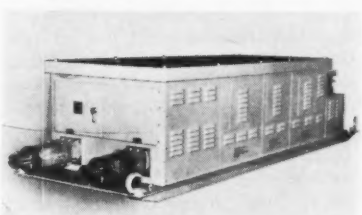
AC Power Units

AC electrical equipment for underground mining developed by Ensign Electric & Mfg. Co., Huntington, W. Va., includes the following:

Transformer—Ensign 300-kva ventilated unit, 4,160-277/480Y. View shows low-voltage section with Ensign lever-action connectors, hand-hole covers for tap-changing, and end of oil-filled cutout assembly at far end. Overall height is 31 in.

Transformer—Ensign 225-kva ventilated unit, 4,160-277/480Y. View shows



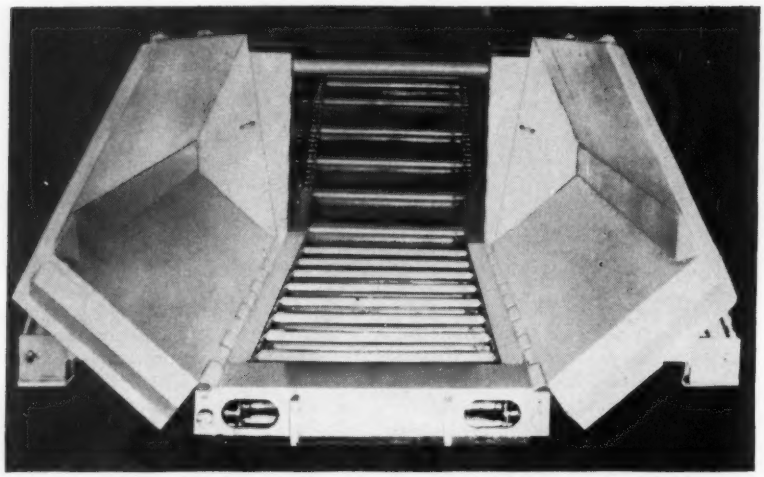


5-kv oil-filled cutouts, incoming cable clamp, and hand-hole covers for tap-changing. Overall height is 31 in.

Disconnecting Junction Box—Available for 4,160 or 7,200 V. View shows double set of disconnects, Kirk interlock mechanism and two outgoing 7.5-kv sockets.

Junction Box—Skid-mounted, 7.5 kv.

Distribution Box—Ensign Five "G" Amherst type. Ensign also will exhibit an automatic belt starter.



Hydraulic Belt and Car Feeder

Developed as a means of accelerating shuttle car performance, the new TransFeeder belt and car feeder is announced by National Mine Service Co., Pittsburgh, Pa. With its hopper of 300-cu-ft capacity, the TransFeeder accepts the shuttle car's load at maximum discharge rate, then feeds it onto the belt or into a car at any desired rate. Sides of the new feeder raise to force the coal onto a center conveyor. Three models ranging from 44 to 58 in in height are available. As the shuttle car operator approaches the TransFeeder, he presses a button located on either rib, starting the cycle. Once the starter button is pressed, operation is completely automatic. With the conveyor operating, the shuttle car discharges its load at fastest possible speed and returns to the loader or continuous miner. Meanwhile, the feeder goes through this cycle: after a predetermined time (usually 45 sec) sides begin to raise hydraulically, directing coal onto the conveyor; after the sides have been fully raised for a selected time (usually 45 sec) the coal has been entirely conveyed to the belt or car; the sides then return to the receiving position and the TransFeeder stops automatically, ready for the next loading cycle. The TransFeeder is balanced on the wheels to simplify moving with a shuttle car.

Other NMS exhibits are described elsewhere in this section.

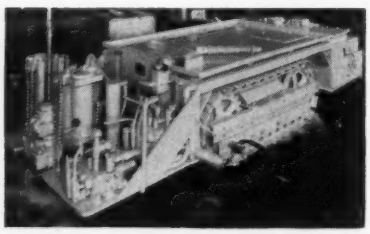
Silicon Rectifier

A new silicon power rectifier (Type 439) for high-current, high-voltage applications is to be exhibited by Westinghouse Electric Corp., Pittsburgh 30. These units can provide up to 240 amp of forward current per cell with maximum peak inverse voltage ratings up to 600 V. Maximum reverse leakage current is 50 milliamp at the rated peak inverse voltage.

Features of the new power rectifier include: operation at high ambient temperatures, up to 190 C at the junction; solid copper base for ruggedness; and small size with maximum cell length of 3 in and over-all weight of 8 oz.

A hermetically-sealed cell, this power rectifier is nickel-plated to maintain low contact resistance and to prevent corrosion. The rectifier case is the cathode (positive) terminal. Ceramic insulation between the anode and cathode provide a greater creepage distance than previously available on high-voltage, high-current, silicon rectifiers.

A ¾-inch stud on the case permits mounting of the cell in any position. Type 349 cells are also available in complete bridge assemblies.



Bolter Collects Dust

A hydraulic roof drill on crawlers, with a built-in dust-collecting system, is featured from Schroeder Bros. Corp., McKees Rocks, Pa. The "Bantam Bolter" maneuvers with dual controls which operate the crawlers together or independently. Tramming speed ranges up to 175 fpm. Dust collecting can be done through conventional suction-head arrangement or through the drill steel. In the latter method the dust is taken through the hollow steel and is carried through rubber tubing to a collector on the machine. The machine is 23 in high, 36 in wide and 102 in long. Operating feed length is 22 in and up, depending upon roof height.

Filter Aids

A current application for Aerosol OT 75% surface-active agent, offered by the American Cyanamid Co., New York 20, is facilitating the dewatering of coal in a filter to permit the cake to be mechanically handled and consequently recovered for shipment. Other Cyanamid products for flocculation are Superfloc 16 and Aerofloc 550.

A-N Booster

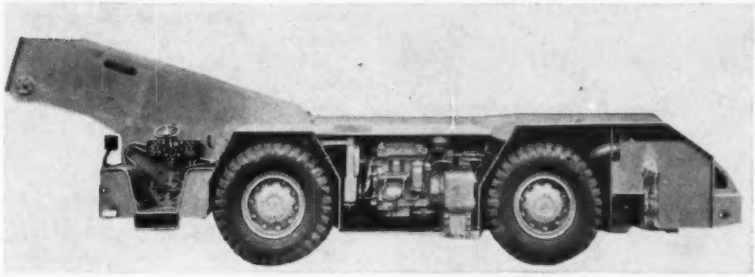
Spenite, a new booster to be shown by Spencer Chemical Co., Kansas City 5, Mo., is a high-velocity, high-temperature initiator especially designed for use with ammonium nitrate-fuel oil mixtures. In addition, Spencer experts will have information on cost-cutting procedures and on bulk-handling methods for users of large amounts of blasting-agent materials.

7-Strand Rope

A new all-purpose wire rope offered by the Macwhyte Co., Kenosha, Wis., under the trade name "7-Flex" features seven strands instead of the 6 or 8 strands generally employed. With extra flexibility and more compactness as a result of using seven strands, plus 16⅔% more wearing surface compared to 6-strand rope, the company points to unusual service records. Sizes presently offered are ½ to 1⅛ in, with new sizes to be added.

Dozer-Loader

Easy conversion from a front-end loader to a dozer is the major feature of the D-120 "Paydozer" line developed by Frank G. Hough Co., Libertyville, Ill. The unit is powered by a 300-hp turbocharged engine and weighs 55,000 lb. The 3-way blade action includes lifting and lowering, and forward and backward pitch, as well as side tilt. The D-120 blade is 12 ft 4 in wide at the cutting edge and 4 ft 8 in high. Clearance under the cutting edge, at full-height lift, is 3 ft 2 in. Digging depth below ground level is 1 ft 6 in. Total forward and backward pitch is 35 deg, and the side-tilt angle is 10 deg each side or a total of 20. Other features include full power-shift transmission with four speed ranges up to 26 mph both directions, matching torque-converter and hydraulic-power-boosted steering.

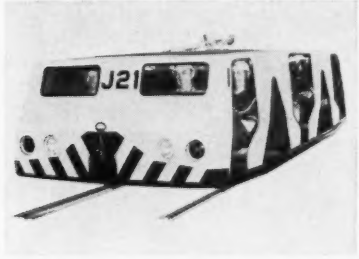


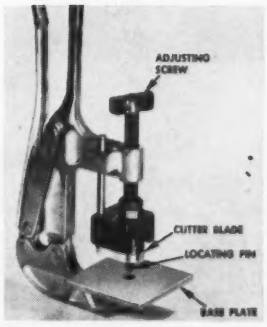
Twin-Diesel Shuttle Car

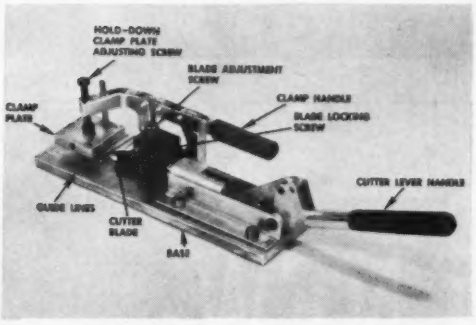
Designed for hard-rock duty, the 20-RC twin-diesel shuttle car, to be shown by Joy Mfg. Co., Pittsburgh, will haul up to 20 tons per load. The two-engine construction splits the work, balances the load and permits narrower car width.

High-Low Coal Travel

A new type of car for transportation of workmen in coal mines, available in models for high coal and in units as low as 24 in for low coal production, is being shown by the Greensburg Div. of National Mine Service Co., 2530 Koppers Bldg., Pittsburgh 19, Pa. Called "Man-Kar," the new carrier may be powered with self-contained batteries or from a trolley wire. Safety features include excellent visibility, rigid unit construction and ability to run at high speeds without danger of derailment. Basic controls are flexible in that they can be furnished in numerous ways to suit particular needs —e.g., in the center of the car, at either or both ends, or as dual control systems. Drum controllers are standard; camtactor and full magnetic contactor type controllers are optional. Brakes are hydraulically-powered drum type with expanding shoes; standing brake being mechanical.

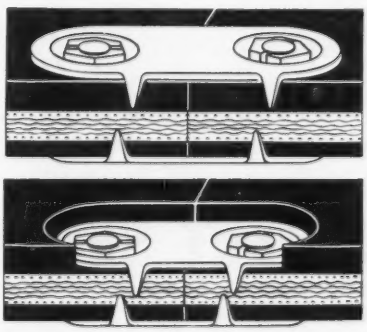






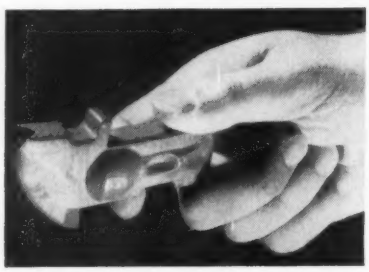
Countersinking Tools For Belt Fasteners

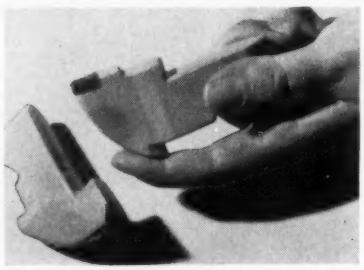
Flexible Steel Lacing Co., Chicago 44, Ill., manufacturer of Flexco belt fasteners, announces the availability of newly-designed equipment for countersinking their fasteners into heavy conveyor-belt covers (3/16 in and over). On heavy rubber covers Flexco teeth cannot penetrate very far into the load-carrying fibers of the belt. Plates are exposed to abnormal wear from abrasive materials and scrapers and rollers may be interfered with by fasteners protruding above the belt surface. Solution of the problem with the new countersinking equipment is demonstrated in the figure below. Here some of the cover has been cut away to permit the Flexco teeth to penetrate the belt carcass, thus affording maximum joint strength. Countersinking of the plates permits clean scraper operation, lengthens fastener life, eliminates noise on return idlers and minimizes abrasive wear on idler bearings. It also cuts down the overall thickness of the belt at the joint, facilitating use of a smaller size Flexco fastener. Splice life is thereby increased because belt flexing at the joint is minimized. The two tools (above) required for the counter-sinking operation hold the belt rigid for ease of operation. The tools make vertical and horizontal cuts necessary for sinking the fasteners.



Rubber-Tired Tractor

Powered by a new GM 6V-71 engine producing 218 hp, the Model C Tournatractor offered by LeTourneau-Westinghouse Co., Peoria, Ill., features hydraulically operated attachments. The transmission is the LW power-shift, air-actuated with torque converter, four speeds forward and a top speed of 18.5 mph. The installation of the new engine permitted shortening the overall length of the tractor, which is now 13½ ft. Width is 10½ ft, ground clearance is 15¾ in, and drawbar height (optional) is 21¼ in. Shipping weight is approximately 30,000 lb.





New Quick-Change Bits

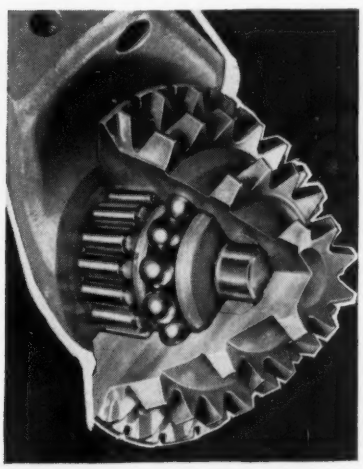
Carmet's "RSS-Quick Change" cutter bit (left), with 1¾-in gage stop on front, is said to save up to 85% changing time on Joy V-Type ripper changes and features a 65% increase in strength, says Allegheny Ludlum Steel Co., Pittsburgh

22, Pa. Bit changes are reported to be just as fast and easy in bit rings and twin-borer bit blocks. Easy operation is accomplished as follows: A threaded plunger designed by Joy engages a forged notch in the bottom of the tool shank. This keeps the cutting tools locked in place. To remove, simply pry set screw plunger outward to retracted position, thus releasing the cutter bit. The plug-type carbide insert used is set at an angle that eliminates braze failure and insert loss.

Two other coal cutting bits, designated the BR-3 and RB-3, are being shown. A neoprene cylinder holds the bits in the cutting blocks or tool holders thus saving considerable time in replacing worn bits, reports the company. They also note some coal producers claim bit changing time has been reduced up to 70% over the set screw system. Carmet is producing both bits with three grades of carbide cutting edge to meet individual cutting conditions.

"Building Block" Load Centers

A new line of AC mine-load centers utilizing a "building block" concept will be introduced by General Electric's Specialty Transformer Dept. Using this building-block approach, standardized components can now be catalogued, making it easier for the mine engineer to select the equipment to meet his needs. The entire line features GE's exclusive "cast coil" transformers. Encapsulated by epoxy resin, the transformers are impervious to moisture and other adverse mining conditions.



Blasthole Bits

Security Super-Aire blasthole bits, product of Security Engineering Div., Dresser Industries, Inc., Dallas 11, Tex., are available in wide variety of sizes for

Coal Show Preview

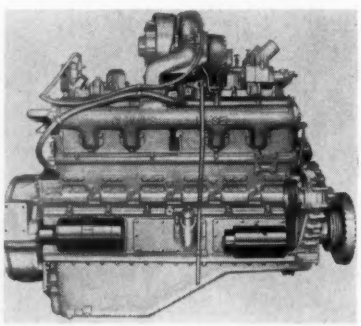
overburden drilling. Features of the bits include (1) variable-size jets and air courses which are field replaceable to suit conditions, (2) unrestricted air passages to the cone bearings, (3) self-cleaning screens to minimize the possibility of plugged air passages which destroy bearings, (4) rugged bearings made of alloy steels, (5) balanced cutting structures designed to drilling conditions, (6) shirt-tail hardfacing on all bits 7⅞ in and larger and (7) reaming lugs to save time by quickly freeing the drill stem in damp formations. Security will also show heavy-duty rock bits in percussion and rotary percussion designs.

Overburden Drill

Davey Compressor Co., Kent, Ohio, announces the introduction at the AMC Coal Show of a new electrically-driven, rotary blasthole drilling rig. The self-propelled drill is designed to drill 9-in holes to a depth of 125 ft, using drill rods 25 ft long by 7 in in diameter. Available pull-down weight on the bit is 40,000 lb.

Dewatering 28MxO

The sludge centrifugal, utilizing the same principle as the continuous solid-bowl coal centrifugal for dewatering ⅜x0 without prethickening or screening, is offered by the Bird Machine Co., S. Walpole, Mass., for removing moisture from 28MxO flotation concentrates or cyclone underflows.

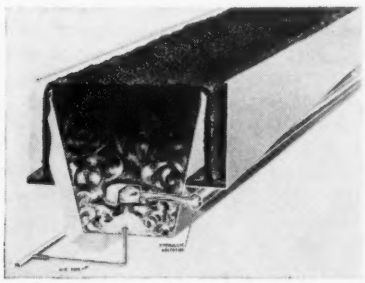


700-Hp Diesel

A turbocharged rating of 700 hp features the new VT-12 diesel engine now made available by the Cummins Engine Co., Columbus, Ind. In the naturally aspirated version, the horsepower rating is 525 hp. Both engines operate at a governed rotative speed of 2,100 rpm.

Cummins also offers two new 8-cylinder V-type diesels. The naturally aspi-

rated V8-350 and the turbocharged VT8-430 are rated at 350 and 430 hp, respectively. Governed maximum speed for both is 2,500 rpm; piston displacement, 950 cu in. V design, says Cummins, makes possible large displacement in a rugged package shorter than the present 6-cylinder smaller-displacement engines. The engines utilize the exclusive Cummins PT (pressure-time) fuel-injection system, delivering fuel to the injectors through passages drilled in the cylinder heads. Both engines are 4-cycle. Weight of the V8-350 is 2,940 lb, or 8.4 lb per hp; of the VT8-430, 2,970 lb, or 6.9 lb per hp with standard accessories.

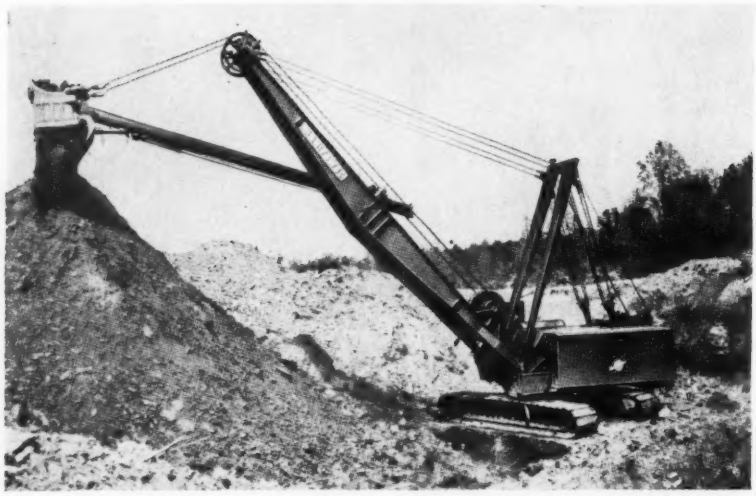


Flotation Cell

The Cyclo-Cell is a newly-developed apparatus, by Heyl & Patterson, Pittsburgh, Pa., which operates on a novel hydro-pneumatic principle to promote froth flotation. A high-velocity jet of water forms a hollow cone and discharges into the cell below water level. A stream of air is admitted to the hollow center of this jet. The air then bursts through the conical spray and is sheared into minute bubbles which disperse through the body of the cell and travel to the surface. The slurry processed in the H&P Cyclo-Cell is thoroughly agitated by the actions of the water and the shearing of the air stream. This agitation combined with the formation of innumerable tiny air bubbles creates a favorable condition for efficient bubble-particle attachment which is necessary for effective, fast flotation.

Crushing, Breaking

T. J. Gundlach Machine Co., Div. of J. M. J. Industries, Inc., Belleville, Ill., will show the new Model 70-DA double adjustable Gundlach crusher, the largest made by the company. In addition, a new piece of equipment, the Gundlach Cage-Paktor, will be introduced. The Cage-Paktor is an impact-type unit which incorporates multiple stages of reduction. It is designed for finer crushing in the range of top sizes of ⅜-in and smaller, even into the mesh sizes. Because of this multiple-stage crushing in a single unit the resultant product contains a minimum of fines or oversize.

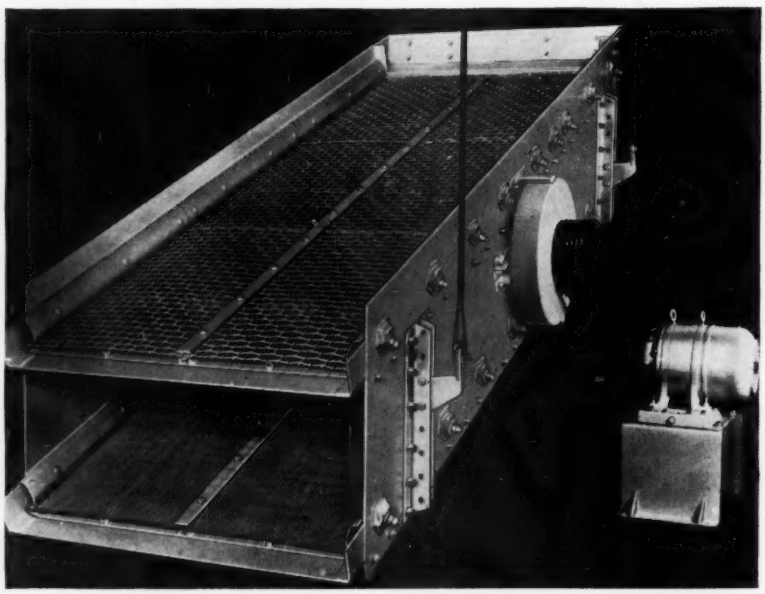


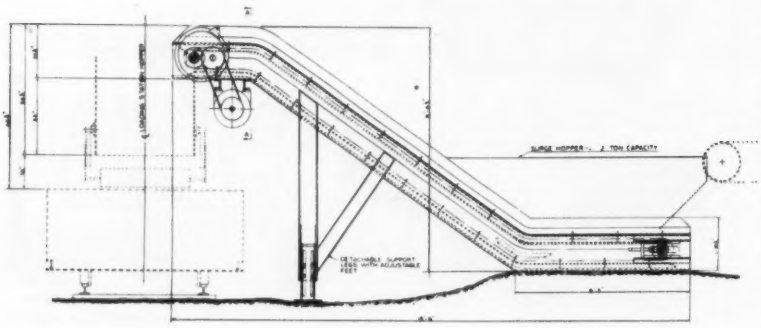
New Excavator

New design and performance is featured in Model 4500 Vicon 6-yd shovel or 7-yd dragline, from Manitowoc Engineering Corp., Manitowoc, Wis. The firm reports new "integrated" controls greatly simplify and speed operation. Elimination of clutch slippage is "revolutionary" in the industry, says the firm. There are no conventional engine throttles on the Vicon. Each clutch control lever in the pilot house is also a throttle. Engaging a swing or drum clutch involves simply pushing or pulling the clutch-control lever from dead center (stop) position. The further the lever is pushed or pulled in the natural direction of the machine's movement, the faster and harder it works in that direction. There is no slippage because the first 10 deg of control lever movement does not activate the throttle, thus clutch engagement is effected at low engine rpm and almost zero clutch and drum rpm. By continuing to move the clutch control lever, which is also the throttle, the machinery is accelerated via the fast smooth three-stage torque converter against the load. An added feature for better dragline performance is the inter-locked hoist and drag drum, which maintains the proper relationship of speeds between the two drums automatically, requiring less operator coordination. This arrangement suspends the dragline bucket in the middle of an endless line, cutting brake use up to 50%.

Vibrating Screens

W. S. Tyler Co., 3615 Superior Ave., Cleveland 14, has a new line of vibrating screens. Called "Ty-Rocket," the screens come without a base and have modular design so that different sizes can be assembled from standard components. Result, says the firm, is lower initial cost without compromising strength and quality standards. The screens are vibrated by an off-balance shaft, supported in two bearings, which imparts a high-speed circle-throw motion to the screening surface. A unique feature—four universal brackets mounted on the side of the frame—permits simple attachment of either supporting feet with spring mounts or overhead cables with spring mounts for suspension mounting. The new line will be available in a range of standard sizes from 3x6 ft to 6x16 ft, two or three decks.



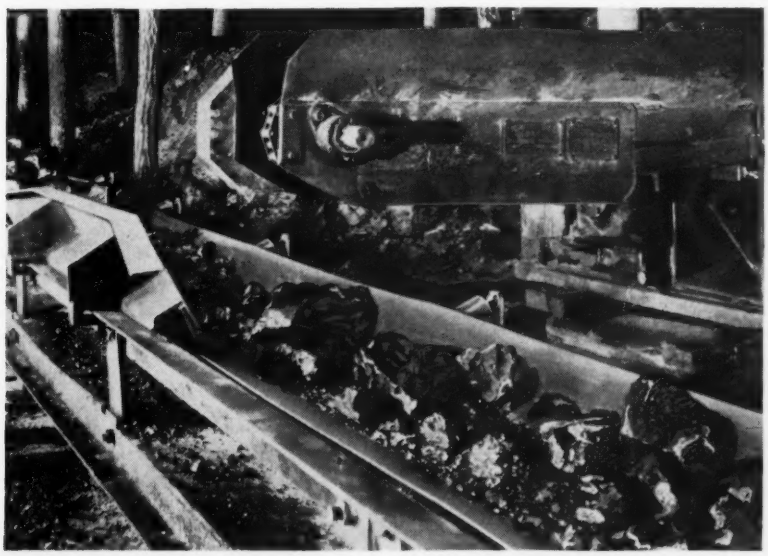


Elevator-Loader

New Nolan Loadveyor, Model C-200, is an elevating chain conveyor with surge hopper for receiving coal from a mother belt and discharging it into a loading chute at a uniform rate. Special feature is the installation of the mother belt horizontally instead of the usual incline normally required to reach the top of the loading chute. This eliminates the necessity of removing roof. Capacity of the unit, says The Nolan Co., Bowerston, Ohio, is 500 tph with a surge bin capacity of 2 tons.

New Caterpillar Model 630 tractor, powered by a 420-hp D-343 engine, teams with an Athey PH630 coal hauler to provide a unit of 60-ton capacity and a top speed of 41 mph. A feature is an exclusive torque divider power-shift transmission which is shifted through a selection lever as the need for up or downshifting is shown on a dash-mounted indicator. The transmission automatically selects the most appropriate of three drives—torque divider, direct or overdrive—within each of the three speed ranges to meet changing power requirements. Other features pointed out by Caterpillar Tractor Co., Peoria, Ill., are 28-ply, 29.5x35 tires, "Live" air-actuated cable controls, an advanced steering system and a high degree of service accessibility.

Tractor Trailer Hauls 60 Tons

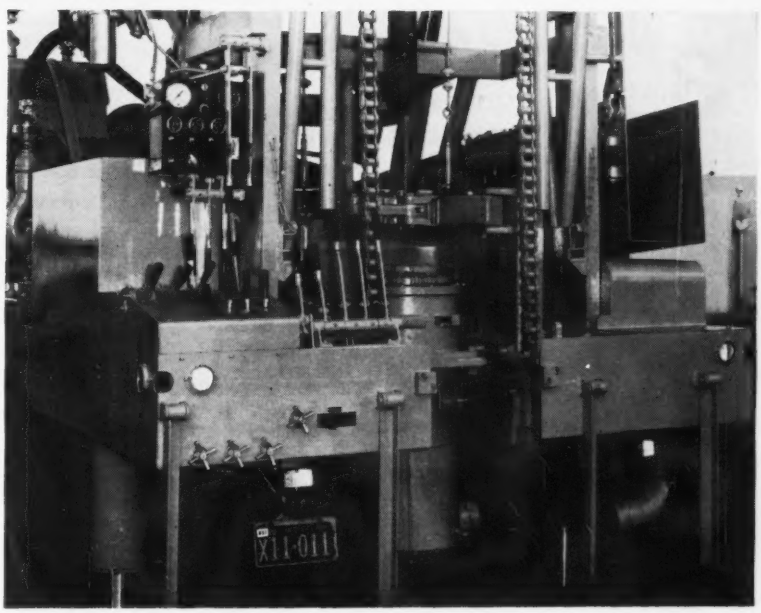


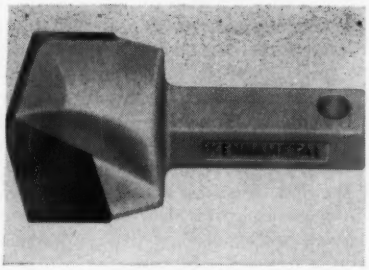
Coal Belt

The "Coalmover" coal belt now being supplied by Manhattan Rubber Div., Raybestos-Manhattan Co., Passaic, N. J., is described as a new type with solid edges that will not fray or fan out under the severest abrasion. Certified as fire-resistant, the new belt is said to be quiet running, longer lived, able to provide a higher coefficient of friction, and to have superior fastener-holding qualities, in addition to maximum rip and impact resistance, exceptional flexibility and easy training at all temperatures. Companion products are the Ray-Man belt for 45-deg idlers and the Wedlok splice.

Portable Blasthole Drill

The Portadrill Model 10TE truck-mounted blasthole drilling machine offered by The Winter-Weiss Co., Denver 5, Colo., is powered by an auxiliary diesel engine. It is equipped with an air-compression system for conventional air drilling or for down-the-hole rotary percussion drilling. Construction is unitized, the manufacturer notes, so that individual components may be varied to custom-fit the machine to the needs of each purchaser. Designed primarily as a blasthole drill, the machine can, if desired, be easily adapted to exploration and deep-hole drilling.



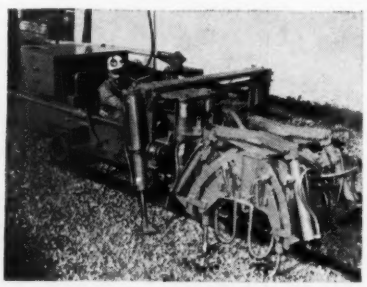


Roof Bit

Kennametal, Inc., Mining Tool Div., Bedford, Pa., points out that its new FDC roof bit is designed to take full advantage of the increasingly powerful rotary and rotary-percussion roof drills. Bit wobble is eliminated, it is said, drill-steel life is lengthened, and the new shape of the bit results in freer cuttings discharge. Five sizes are available for 1⅜- to 1¾-in holes.

Hoist-Drum Conversion

A service for regrooving shaft-hoist drums on site is now available from Lebus International Engineers, Dallas, Tex., to permit the use of longer, larger ropes for deeper hoisting. Known as Lebus Counterbalance Spooling, the completed conversion makes it possible to spool more than three layers of rope while eliminating excessive wear at the crossover points. Instead of replacing an entire hoisting unit, consideration can be given to converting the drum and adding drive horsepower.



Low Track Tamper

Placing the tamping tools forward of the machine results in an overall height of only 40 in for the new track tamper designed by J. H. Fletcher & Co., Huntington 18, W. Va. Track clamp, levelling jacks and cross-slide control are the same as on standard machines.

Shovel Teeth

Use of the Amsco Simplex 2-part tooth, American Manganese Steel Div. of American Brake Shoe Co., Chicago Heights, Ill., observes, can cut tooth costs up to 75%. Features include a positive point-to-adapter lock that stays tight under all conditions, and ability to reverse the points with ease. Some adapters can be furnished with renewable wear caps.

Replaceable Cones

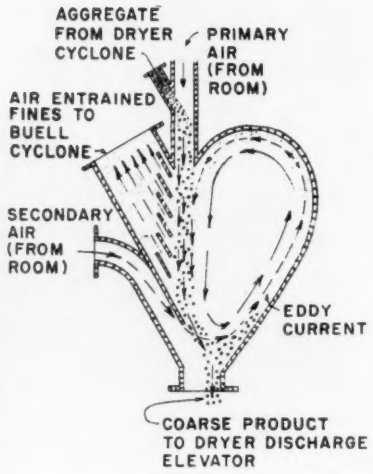
The new replaceable cone-type rock bit offered by the Varel Mfg. Co., Dallas 20, Texas, permits, according to the manufacturer, replacement of each cone individually as needed, thus saving as much as two-thirds of the bit's cost. These and other Varel bits are available in sizes from 2⅜ through 12¼ in.

Exhaust Tubing

Developed by the American Brattice Cloth Corp., Warsaw, Ind., with the special requirements of continuous mining in mind, MineDuck exhaust tubing, wire-reinforced, is offered by the company for the efficient removal, by suction, of fouled air and dust from working faces. It also can be used for blowing. It is easy to suspend from messenger wire, and to take down, move and rehang. The fabrics used are coated with neoprene for greater resistance to air friction and particle abrasion. The high-tensile wire used for reinforcing is totally enclosed and thus completely protected. Other features cited by the manufacturer include: light weight — one-third that of metal tubing, high wear resistance, extreme flexibility, lower cost, susceptibility to being compressed into small space for moving and storage, air-tightness and resistance to flame.

Heavy-Duty AC Shuttle Car

New Type 1070 shuttle car, to be introduced by Goodman Mfg. Co., is designed for heavy-duty AC service and has 10-ton capacity that can be increased with sideboards. It is available in basic heights of 44 and 49 in and with 39- and 49-in conveyor. A single 80-hp traction motor provides two-speed tramming without need of transmission or clutches, and permits a greatly simplified electrical system. A 26-hp motor powers the conveyor and the hydraulic system. Both motors are rated at 75-deg C rise, full load. Planetary reduction geared hubs in each wheel unit provide high torque where it is needed, reduce the wear and strain on the entire tram mechanism. Speed of the fully loaded car is 5 mph reports the manufacturer of the unit.



Air Classifiers

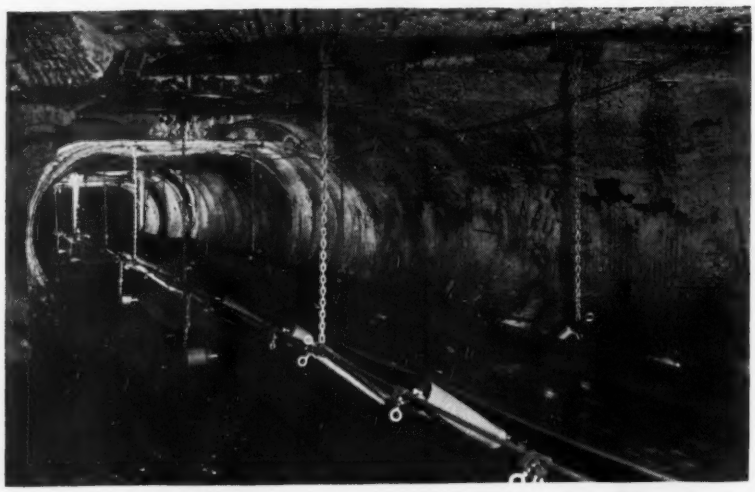
Buell Engineering Co., Inc., New York 38, N. Y., will exhibit Buell classifying system for air separation of dry materials. Classifiers are designed to utilize gravitational, inertial and centrifugal principles in handling from 100 lb to 100 tons of feed per hr. Buell classifiers, new to the coal industry, contain no moving parts and can do their own pneumatic conveying, thus simplifying installation and plant operation.

Versatile Rotary Rig

The versatile new C-350 REICHdrill will be the featured attraction at Chicago Pneumatic's American Mining Congress exhibit. A crawler-mounted top-drive rotary rig, the all-hydraulic C-350 can exert up to 10,000 pounds down-pressure. Designed for maximum versatility, coring, prospecting, blastholing or in seismograph work, the C-350 can be equipped with diamond core bits, wire line tools or three-cone rotary rock bits. Completely self-contained, the powerful rig employs a 95-hp diesel to drive its fluid-smooth, rock crushing system. Without kelly or rotary table to impede operations, the top-drive C-350 changes stems and gets back into the hole fast and easy, the company says. An infinite number of rotational speeds —from 0 to 200 rpm—are available to the REICHdrill at the turn of a handle. Superior hole cleaning, thus better bit life, is assured through the use of an all-weather, air-cooled CP compressor which provides 164 cfm for hole cleaning purposes exclusively. Highly maneuverable, the C-350 can tram at 8 mph and climb a 25% grade.

Compact Motor Control

Developed for control of high-voltage motors by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., "Spacemaker" control units are said to be exactly one-half the size of previous models, yet ratings and capacities are the same. The "Spacemaker" concept will be available as a complete line, with full- and reduced-voltage, reversing and nonreversing controllers for squirrel-cage, synchronous and wound-rotor motors.

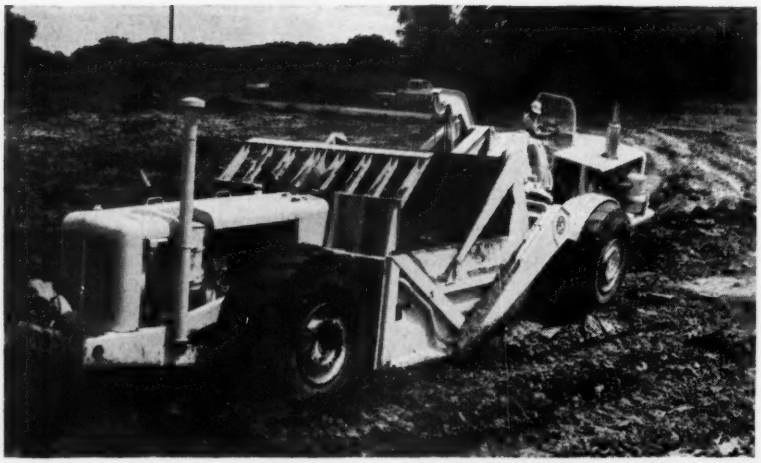


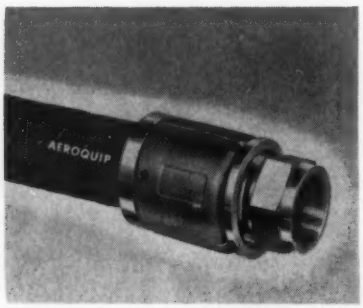
New Ropeframe Conveyor Design

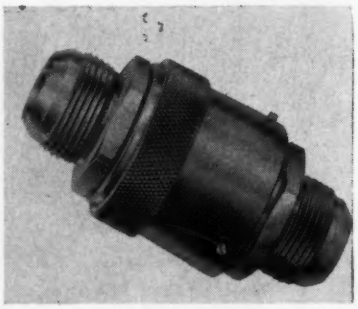
A new 90-ft section of Goodman ropeframe conveyor will be introduced at the Coal Show, featuring a new tandem-drive head section with adjustable-height discharge boom. The boom is equipped with a flop gate chute. A new tail section for shuttle car conveyor loading also is a new feature. All latest designs of available carrying idlers, return rollers and wire-rope supporting stands will be included in the 90-ft exhibit section.

Twin-Powered Scraper

The TS-14 scraper is a new entry in the earthmoving field by Euclid Div., General Motors Corp., Cleveland. It is a twin-engine, all-wheel-drive scraper powered by two GM diesel 4-71 engines totaling 296 hp. Its capacity is 14 yd, struck, 20 yd, maximum heap. The TS-14 is a smaller version of the widely used TS-24 twin scraper introduced 6 yr ago by the Euclid organization.







High-Pressure Hose, Fittings

Aeroquip Corp., Jackson, Mich., introduces new high-pressure hose and self-sealing coupling for hydraulic lines. The new hose, known as 2755 Spiral Wrap, is ideal for hydraulic systems where 1¼- to 2-in sizes are required at working pressures up to 3,000 psi. It is constructed of alternating layers of spiral-wire wrapping and synthetic rubber. The fittings are leakproof and blow-off proof, yet are completely detachable and reusable. The 3750 Saf-Loc self-sealing coupling is specially designed to provide fast, safe connections. Partial connection will not permit fluid to flow. Three checks are used to verify positive connection, an audible click, visual indicator pins and through the feel of indicator-pin position. The pins are visible in photo at right.

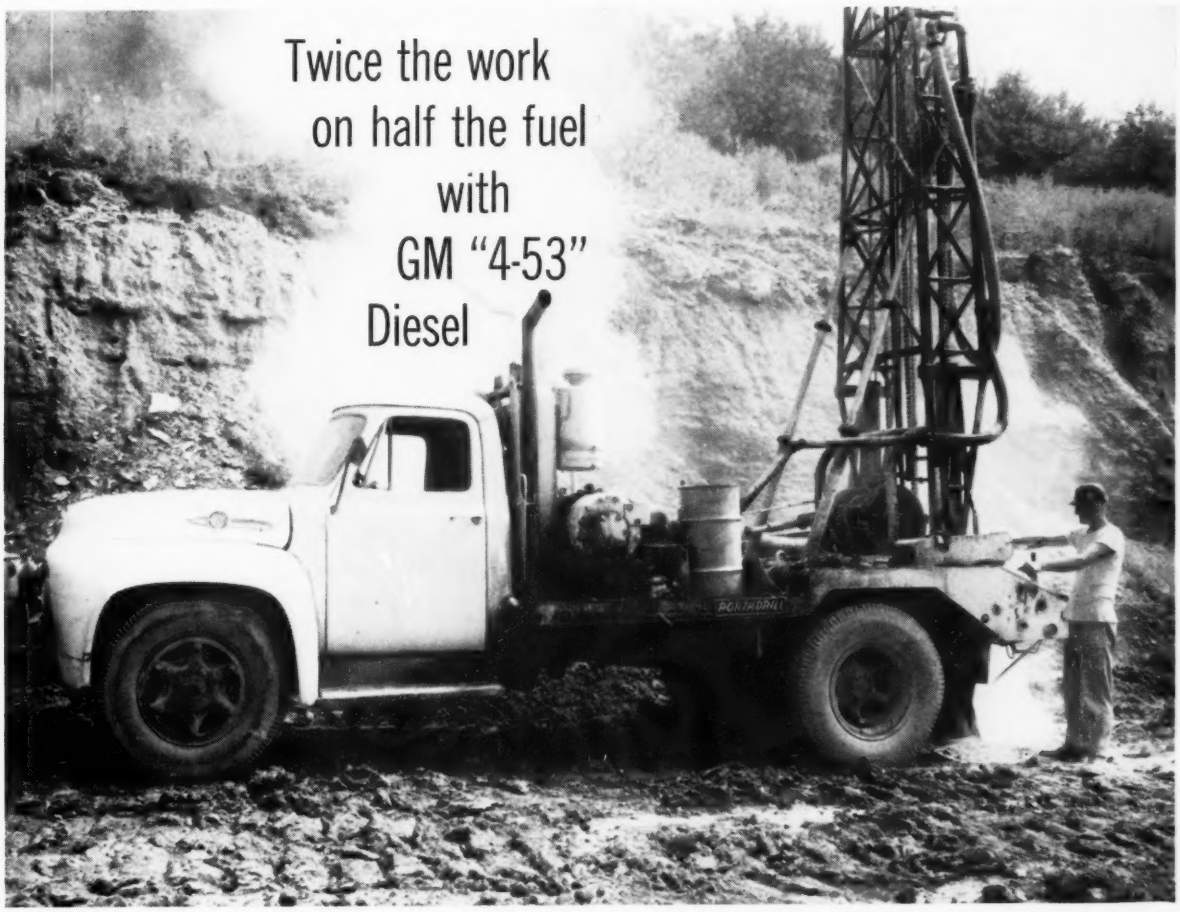
Blasting Agent

Accomite WR is a water-resisting nitrocarbo-nitrate blasting agent now being supplied by American Cyanamid Co., New York 20. Even after 48 hr of exposure, tests showed that it fired at full strength, the company reports. "As with all blasting agents it is important to maintain column continuity, enforce correct priming and obtain compaction." Properties include: weight strength, 79%; cartridge strength, 65%; rate, 8,000 A. cartridge count, 122, 1¼x8-in.

Ammonium Nitrate

Ammonium Nitrate C-2 is described by the American Cyanamid Co., New York 20, as fertilizer grade with improved sensitivity. It is said to be particularly adapted for holes less than 3 in in diameter, and may be stored for reasonable periods of time without caking.

GET REAL PRODUCTIVITY—GET A GM DIESEL



"Since we converted our Winter-Weiss Drill to '4-53' GM Diesel power, production has gone from 180-200 ft. per day to 350-400 ft. per day, and we use only half the fuel," says Mr. Paul Carapellotti, Secretary of Anthony Mining Company, Steubenville, Ohio.

That's the kind of profit-making productivity you can look for when you repower your gasoline-driven equipment with a Series 53 "Jimmy" Diesel.

But increased production and lower fuel costs aren't the only savings. "Before we switched to the '4-53'," says Mr. Carapellotti, "we couldn't get a hole drilled without a lot of costly repairs. Now we're in business to drill! We've never had any downtime in over a year of heavy going and the only part replacement has been an air cleaner."

Higher productivity . . . reduced fuel consumption . . . lower fuel costs . . . less downtime . . . more work per man-hour . . . these are the pay-offs that help you beat today's profit-squeeze.

Put a Series 53 "Jimmy" Diesel to work for you! They're available in 2, 3, 4, and 6V models, from 20 to 195 H.P. And they're built to the same rugged standards as their bigger, mine-proved brothers, Series 71 GM Diesels.

For the whole moneysaving story, see your nearby GM Diesel Distributor. His only business is engines and he's set up to service what he sells. Look for him in the Yellow Pages under "Engines, Diesel."

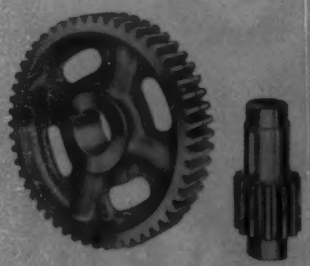
GM DIESEL

DETROIT DIESEL ENGINE DIVISION,
GENERAL MOTORS, DETROIT 28, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario
Parts and Service Worldwide

GM DIESEL ALL-PURPOSE POWER LINE sets the standard of Diesel productivity

Nordberg cone crusher gear.



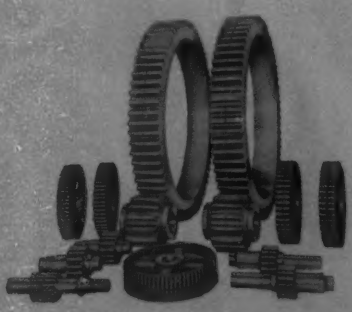
Gear and shaft pinion.

you can save

Drive gear and pinion.

Cab roller.

THOUSANDS OF DOLLARS BY USING



Overhead crane gears and pinions.

Swing shaft bevel gear.

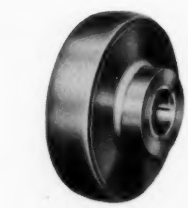
Ring bevel and shaft pinion.

Many of our customers in the Mining Industry both here and abroad, have already done so, in replacement cost savings alone. Ordinary untreated products simply cannot compete with "Tool Steel Process" hardened products in wear resistant qualities. TSP hardened products have a phenomenal long life. They seldom need to be replaced because of wear or breakage. They carry an exclusive written guarantee stating they will outlast any other product in the same service. All TSP products are hardened by our special process. The file hard surface to full depth of permissible wear gives maximum life. The core, refined for toughness and ductility, gives maximum strength. They are made to order from your blueprints. Gears are made in sizes up to 90" diameter. Other products up to 20,000 lbs. weight. Our representatives are located all over the world and are equipped to offer complete service. Simply write us direct for all necessary information, technical bulletins, etc.

THE TOOL STEEL GEAR & PINION COMPANY

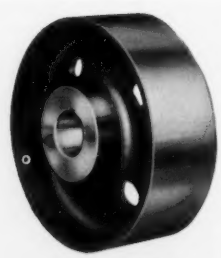
CINCINNATI / OHIO / USA

the standard of quality since 1909 for gears • pinions rolls • wheels and other hardened products.



Bottom roller.

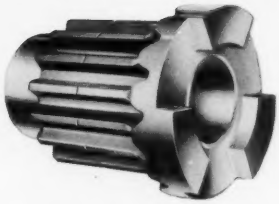
Drive gear and pinion.



Brake wheel.

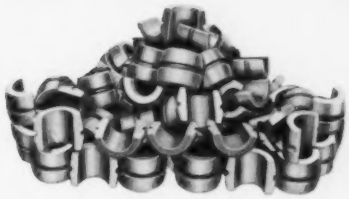
Ad No. 1054

Printed in U.S.A.



Dragline walking pinion.

Rope drum.



Half bearings.

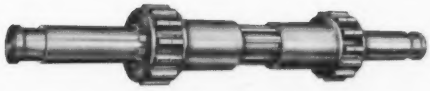
Rotating shaft.

Drive pinion.

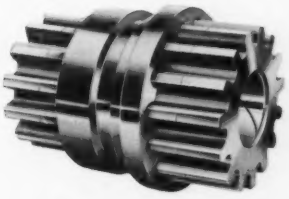
Bevel gears.

THESE TSP HARDENED PRODUCTS

Sheave wheels.



Shipper shaft and pinions.

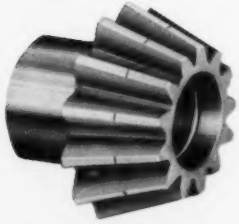


Drive pinions and clutch.

Vertical swing shaft.

Horizontal swing shaft pinion.

Trunnion rolls.



Bevel pinion.

Swing shaft pinion.

Loading machine bevel gear.

IF YOUR CRAWLERS HAVE "CLASH BOXES" BETTER CHECK THE ADVANTAGES OF THE "EUC" C-6

Without full-power shift even a "brand new" tractor is an obsolete machine in performance and work-ability when compared with the new Euclid C-6 crawler. For the fast response and all-around versatility that's needed in mines, quarries, construction and industrial work, no other tractor has all the advantages you get in the C-6.

Proven Torqmatic Drive provides full-power shift and instant reverse without delay for clutching and shifting . . . with a flick of the wrist you change direction or from one speed range to another. It's the same easy-to-operate power train that has proved its dependable service in thousands of other earthmovers.

Get the facts on how the C-6 can cut costs on your jobs . . . from dozing and ripping to push-loading big scrapers. You'll find the many operating advantages of this modern tractor will bring you a better return on your investment.

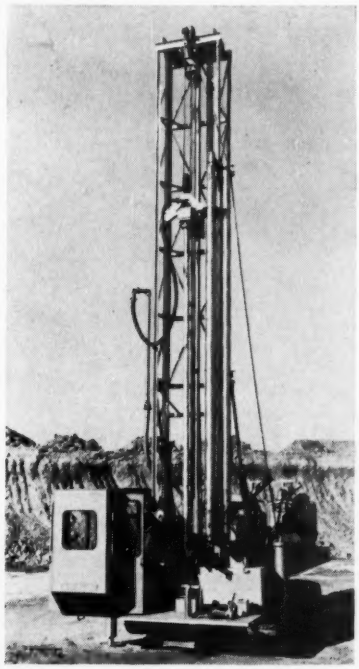
EUCLID DIVISION OF GENERAL MOTORS, CORP., CLEVELAND 17, OHIO

DOZING and RIPPING **. . . plenty of power, easy operation and good stability make the C-6 tops for work in rough going and heavy material.**

GM GENERAL MOTORS EUCLID

EUCLID

FOR MOVING EARTH, ROCK, COAL AND ORE



Rotary Rig

The Le Roi LRD-3 is a new type of high-torque, mechanical-drive rotary drill for bit sizes of from 6 to 7⅞ in with rotary or down-the-hole tools. Through a series of gear reductions in the drive shaft the drill maintains constant rpm on the bit at low engine speeds. Top drive design permits the operator to add pipe from the magazine without taking the string from the hole. To be shown by Le Roi Div., Westinghouse Air Brake Co., Sidney, Ohio, the LRD-3 (photo) is available on truck or crawler mounting. Down pressure on bit is up to 30,000 lb, and rotation speeds are from 9 to 168 rpm. A companion rig, the new LRD-2, is designed for one-man operation in drilling 3- to 4½-in holes.

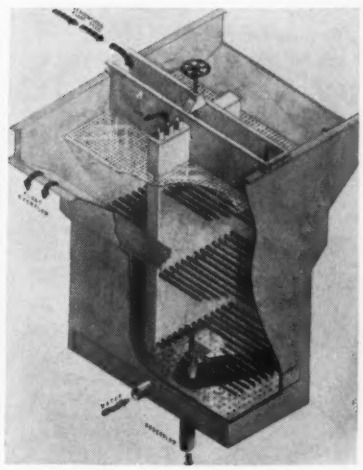
Special-Duty Steels

Two new developments in the fields of "T-1" and stainless-clad steels are being offered by the Lukens Steel Co., Coatesville, Pa.:

1. "T-L" steel in 360 Brinnell hardness quality up to 1½ in thick for increased durability, and also in 321 minimum BHN quality in 3/16- to 6-in thicknesses.

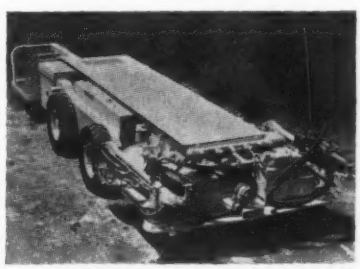
2. Addition of Lukens "T-1" Type A steel to the "T-1" family. This type is said to combine high-strength-level properties with maximum economy. Making its debut as the third special steel in the coal area, "T-1" Type A is available in thicknesses up to 1 in, and is produced to a minimum 321 Brinnell.

"T-1" in various types is used where combined abrasion and impact resistance is desired, or where structural strength is important. Stainless-clad plate (a layer of stainless permanently bonded to an economical steel backing plate) provides maximum resistance to wet-coal corrosion, the company notes.



Flotation Cell

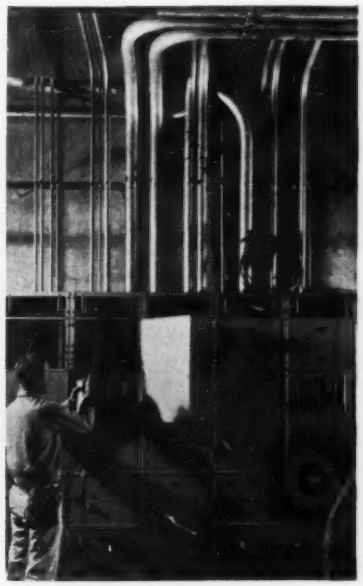
The Hollingsworth flotation cell is introduced by Wellman-Lord Engineering, Inc., Lakeland, Fla. This cell has been successfully operated in the central Florida phosphate field in separating phosphate rock from sand. Recoveries of phosphate rock have been increased approximately 10% in the Hollingsworth cell, the company says.



Bolting Equipment

Use of a rotary compressor in the self-propelled mine compressor with roof-bolting arms and integral-dust-collecting stopers developed by Acme Machinery Co., Huntington, W. Va., permits delivery of considerably more air at cooler operating temperatures, the company states. Vibration is materially reduced.

Acme also offers the Model SPHRD-1 roof-bolter, which it notes is designed for cycle roof-bolting in high-production sections. The unit is built ruggedly and is highly compact. Finger-tip control with 4-wheel drive and tractor-type steering are said to make it a highly mobile unit.



Improved Conduit

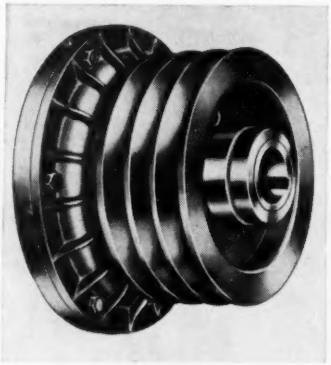
Kaiser Aluminum & Chemical Corp., Oakland 12, Calif., is introducing an improved rigid conduit with a new type of interior lubricant which is said to reduce the effort in wire pulling by as much as 75%. The coating, known as K-40, has a high silicone content, providing a slippery interior surface. The conduit is marketed under the trade name "Kingfisher."

Roof-Bolt Drill

Chicago Pneumatic Tool Co., New York 17, N. Y., will show a self-propelled roof-bolting unit, the RBD-30SD, featuring Augermatic through-steel dust collection. It is claimed the unit completes a cycle from drilling to setting the bolt in 3 min.

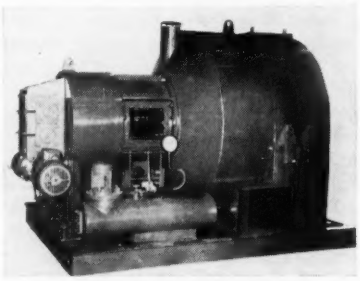
Electric Feeder

A feeding capacity of over 100 tph is noted by the Eriez Mfg. Co., Eriez, Pa., for its 75A HI-VI vibrating feeder. It is available as a suspended or base-mounted unit, with permanent electromagnetic drive operating directly from DC without a rectifier.



Dry Fluid Drives

Using loose shot in appropriate housings, Flexidyne dry fluid drives and couplings offered by the Dodge Mfg. Co., Mishawaka, Ind., as one item in its line of power-transmission machinery, are said to pick up the load with the same smoothness as a conventional hydraulic device, with the same protection against shocks and overloads, plus reduced maintenance. At the same time, when the unit is up to speed it provides the advantages of a solid connection. Eight drives and 10 couplings are available from stock to 1,000 hp, with larger sizes furnished on order.



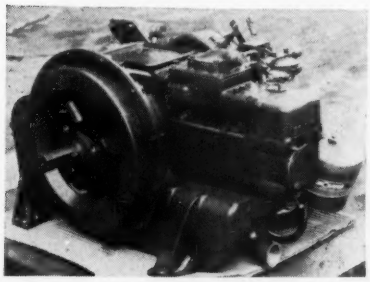
Centrifugal Dryer

Wemco Div., Western Machinery Co., San Francisco 7, Calif., will feature a full-size production model of the company's new Wemco Siebtechnik centrifugal dryer. The unit will be specially painted and arranged so that major working elements may be closely inspected. A cutaway drawing will illustrate operating principles.

Slurry Explosive

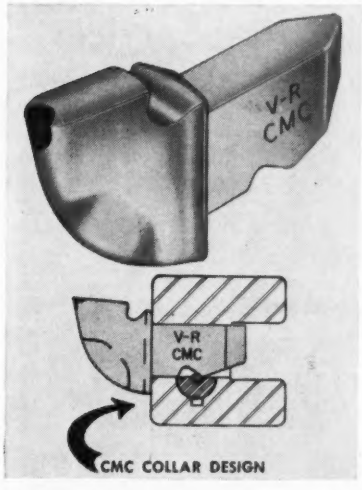
Cyagel 100 is offered by the American Cyanamid Co., New York 20, as a non-cap-sensitive slurry explosive with the desirable characteristics of safety, no headaches, high density and excellent water resistance. It is said to be particularly

suitable for strip mining, especially under wet conditions, and its high rate of detonation produces "excellent breakage." Since it is stronger, use of this slurry permits greater spacing of holes and thus cuts drilling cost.



Air-Cooled Diesels

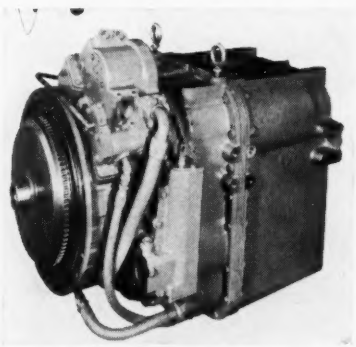
Various sizes and models of Lister air-cooled diesel engines, in conjunction with attachments such as pumps, generators and welders, will be displayed by J. & J. Coal & Equipment Co., Cleveland, and Boyers Machinery & Supply Co., Boyers, Pa. The unit in the photo is Model SL-1, a single-cylinder engine developing 5.25 hp at 2,250 rpm. The line ranges from 3½ to 72 hp and from one to six cylinders. Hand starting even in cold weather is one of the advantages, and the air-cooling features eliminate the need for coolant and cooling system maintenance. The unit shown is horizontal type for use where space is limited.



CMC COLLAR DESIGN

Shrouded Bits

New CMC bits offered by Vascoloy-Ramet for use in quick-change blocks incorporate a shroud which is said to completely surround the bit opening, reducing block wear due to bit wobble. Locking-pin life is extended because fines are prevented from entering the locking device.

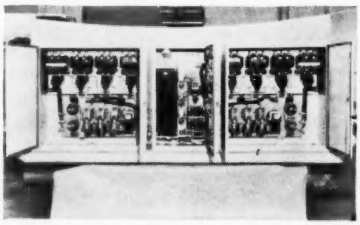


Power-Shift Transmission

Twin Disc Clutch Co., Racine, Wis., will display the TA-51-2000 Series power-shift transmission which is designed for use with engines of approximately 420 net horsepower at a nominal engine governed speed of 2,100 rpm. Maximum engine net torque is 1,050 lb ft. The transmission has five forward speeds and one reverse. Two outstanding features are (1) a free-wheeling stator that removes itself from the circuit as the need for torque multiplication diminishes and (2) hydraulic retarding within the transmission to save truck brakes. Also to be shown is a new J-310 Series universal joint, with caged roller bearing design and nylon washer.

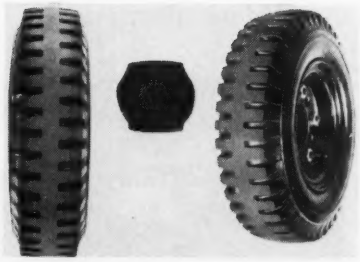
Electrical Services

Burndy Corp., Norwalk, Conn., will exhibit and demonstrate Thermoweld, a simple, portable method of welding copper to copper or copper to steel without the use of an external power source, and cable-pulling compounds designed to ease electrical construction and maintenance. Both are new with Burndy.



Belt Starter

A new high-capacity AC magnetic starter for belt conveyors developed by Ensign Electric & Mfg. Co., Huntington, W. Va., bears the designation Bulletin 26100. The unit shown has a rating of 125 hp, dual 4-point operation, wound-rotor motors.



Solid Tires

Bearcat Tire Co., Chicago 9, Ill., announces an off-the-road tire for front-end loaders and similar equipment which is a mixture of rubber and nylon. This material makes possible a solid tire with pneumatic-like ride. Tire fits standard rims.

Belt Fastener

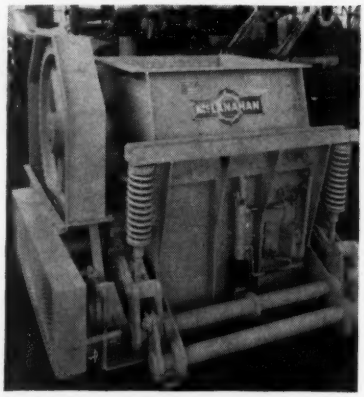
Hayden Zipper belt fastener, by National Mine Service Co., Indiana, Pa., has adjustable jaws for different thickness of belt and crimps the ground-pointed hooks in three stages with each lever action, while the belt is held firmly by spring clamps. Even a novice can make a perfect splice, says National Mine Service. The unit weighs 36 lb, is easily portable and can be used in thin seams.

AN Primers

Of cast pentolite (TNT and PETN) composition, Cyaprime primers introduced by the American Cyanamid Co., New York 20, are said to provide good initiating and priming efficiency for nitro-carbonitrates, AN-fuel-oil mixtures and slurries. The primers are made with two axial bores through the long axis—one bore open for inserting detonating fuse and the other blind for an electric blasting cap. Cyraprime No. 1, 1 lb, 2¼-in diameter and 3¾ in long, comes 50 in a case; Cyaprime No. 2, ½ lb, 2⅛ x 2$^{9}/_{16}$, 100 per case.

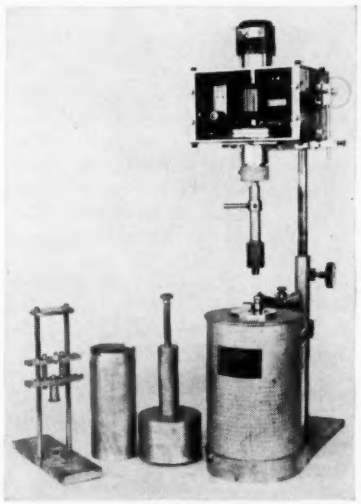
Chemical Grout

AM-9 chemical grout is offered as a new concept in soil stabilization by the American Cyanamid Co., New York 20. It checks seepage by turning water and soil into a stiff continuous gel within a controlled period of time. AM-9 is applied with a catalyst in water as a non-viscous solution that the company says will penetrate any formation through which water flows. The solution is injected or percolated, and time to solidification to a stiff gel can be closely controlled from a few second to several hours by choosing the appropriate catalyst.



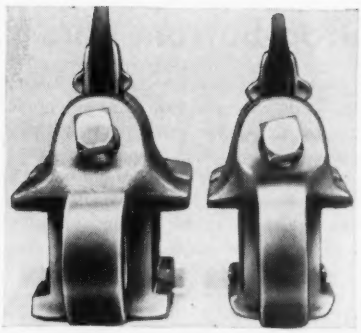
Protects Crusher

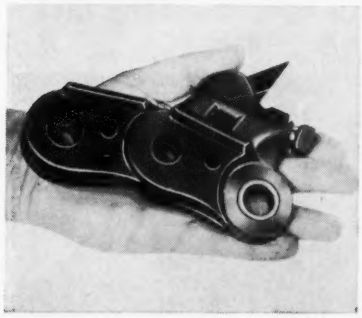
A special design modification on the McLanahan & Stone two-stage crusher will be shown for the first time. This is a spring-loaded toggle device on the secondary-stage double roll for automatic passage of tramp iron and other uncrushable material without shutting down the crusher for replacement of pins or shear blocks. According to McLanahan & Stone Corp., Hollidaysburg Pa., the new design is primarily for high-capacity operation where even short downtime is detrimental.



Laboratory Aid

Automatic Gieseler Plastometer, an instrument for determining plasticity of coals in the coking process, employs the principle of a constantly-impressed torque in place of the intermittent torque application of the manually-operated model. Offered by Commercial Testing & Engineering Co., Chicago 1, Ill., the new method permits the test sample to remain in the crucible throughout the test, allowing for better duplicability of results.





Cutter Chain

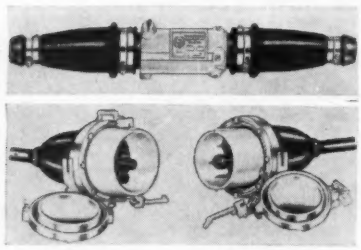
A new stronger cutter bar for universal machines, new heavy-duty chain for continuous miners and a new thin-kerf chain for machines using 20 hp or less will be shown by Bowdil Co., Canton, Ohio. The new Series 80 cutter bar is beefed up in overall dimensions to fit new, larger machines. It includes heavier wearing strips and rivets and is designed to carry the larger Bowdil chain and sprockets. The thin-kerf chain which makes a kerf of from 3 to 3½ in reduces the amount of cutting to the point where higher feed speeds may be used.

Belt Splicing

Two new-type hinge pins for conveyor belting offered by the General Splice Corp., Beckley, W. Va., feature armor and plastic coverings respectively. The company also features two new splices designed especially for solid-woven-carcass belts. A further product is the new Minet belt clamp, said to require no bolts or tools to apply. The tool is especially adapted, the company notes, to ropeframe-conveyor belts.

Mining Elevators

The advantages of AC power for mine elevator service is stressed by the Haughton Elevator Co., Div. of the Toledo Scale Co., Pittsburgh 12, Pa. Simplicity and durability are other features adding to the cost savings of the simplified AC control apparatus.



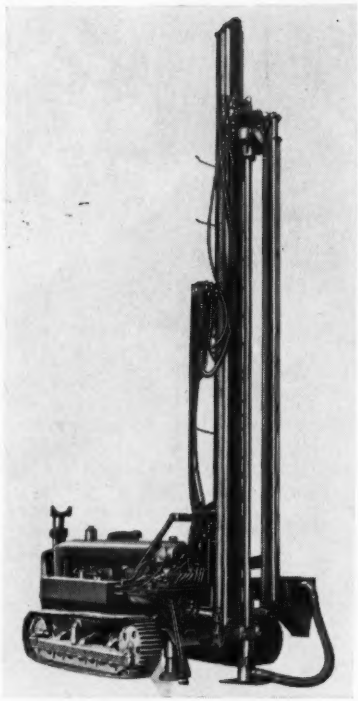
Cable Connectors

A new 7.5-kv multiconductor connector, in both portable and stationary types, is being introduced by Brad Harrison Co., Hillside, Ill. This connector, the company states, is completely water-sealed, employs no compound in the wiring chamber, and has no threads for closure. It has a capacity up to 600 amp and all parts are replaceable.

A second Brad Harrison development is a complete line of coupling-type connectors for both fresh-air and gaseous areas. The permissible type carries USBA Approval 2-1222. Standard W, G and PG cable can be used and the company notes that no pilot lines or relays are necessary for permissibility. Made in portable and stationary types for both DC and AC, the connectors handle up to 300 MCM AC, 400 MCM DC and single-conductor up to 750 MCM.

Communications

Com-Tronics, Inc., Pittsburgh 28, Pa., a newly organized company plans to offer a transistorized amplified-paging telephone system, a tone transmission system for control applications and TMR transistorized mine radio system for underground communications.



Air-Powered Drills

Schramm, Inc., West Chester, Pa., introduces three new drills to the coal industry. Model C42 crawler-mounted Rotadrill (photo) is a self-propelled rig which furnishes its own air, no separate compressor being required. It drills holes up to 6 in in diameter and has a mast travel of 22 ft. Model P41 Rotadrill is mounted on a wheeled tractor-compressor which is self-powered and self-propelled. Mast travel is 12, 17 or 22 ft and hole diameters up to 4½ in are drilled Model 250 Pneumatractor carrying a DR-126 drifter is a self-contained outfit capable of drilling at all angles for smaller diameter blastholes ans secondary drilling, up to 3¼ in. Steel changes are 8 ft; feed is 10 ft in all directions.

Portable Winch-Hoist

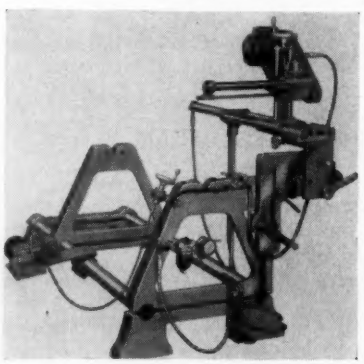
Lightweight cable-lever ratchet winch-hoists now being offered by The Lug-All Co., Haverford, Pa., can be lowered or backed off more than one notch at a time. At the same time, according to the maker, light weight, compactness and flexibility are retained. Lowering work now can be done four times faster with this "Rapid-Lowering" series, availble in capacities from ½ to 2 tons, cable lengths of 38 ft, and weights from 7 to 15 lb.

Drop-Bottom Cars

Sanford-Day Corp., Knoxville, Tenn., will exhibit for the first time automatic drop-bottom cars with overlapping ends, spring-mounted trucks and hard-faced fabricated wheels. The cars employ the use of U. S. Steel's T-1 which has a high resistance to impact and abrasion and is readily weldable. Use of this steel permits a reduction in tare weight of more than 25%. Also shown will be a system for automatically loading the overlapping-end cars, and a scheme for using sonar controls to automatically load railroad cars at tipples.

Taper-Shank Bits

Frank Prox Co., Inc., Terre Haute, Ind., will feature their PT-2 and PT-3 taper shank bits and holders. The new bit embodies a circular shank which offers maximum strength since much greater area is in contact with the holder. A major advantage is that the quick-change bit requires no set screws, rubber retainers or other holding devices.



Commutator Tool

A new industrial undercutter for armatures up to 60 in in length is the entry of Martindale Electric Co., Cleveland, Ohio. Operation is semi-automatic through an air piston actuated by a foot valve to position the saw in the commutator slots. Indexing is done by a hand wheel for quick, positive positioning of the armature. Other compensations may be made for variations in commutators.

Automatic Valve

Offered by Acme Machinery Co., Huntington, W. Va., the Acme Model APC-77 automatic shutoff valve for dust collectors is controlled from the throttle valve of the stoper. Thus the operation of the dust collector is automatically stopped when changing steel, etc.

Headlight Resistor

Designated the Series E200, a new headlight resistor announced by Acme Machinery Co., Huntington, W. Va., is suitable for use on permissible equipment. Compactness is cited by the manufacturer, which notes that the resistance unit itself is completely enclosed for protection and safety. Specifications include: overall length, 23½ in; overall width, 6⅞ in; thickness over bolts, 3⅝ in; number of glands, 2 or 3; cable sizes accommodated by glands, 16-2, 14-2 and 14-3; rated voltage when used in series with one 150-W 115-V lamp, 250 V DC.

Dense-Medium Unit

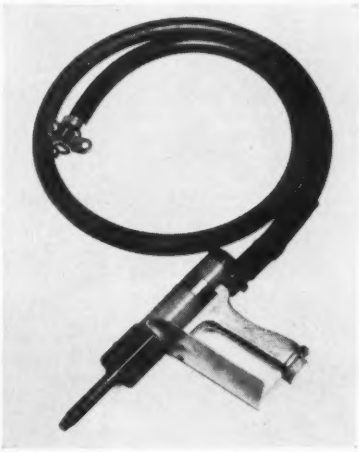
Nortons-Tividale, Ltd., Staffordshire, England, offers the new Norton dense medium washing system, which separates with accuracy down to ⅛ in, says the company. Medium consumption at operating installations has been in the range of from 4 to 7 oz of magnetite per ton of raw coal. A number of installations have been made in South Africa and England.

Coarse-Cutting Bit

Newly designed rake and clearance angles are said to enable the new V-R Style CCMJ Red Bits, introduced by Vascoloy-Ramet Corp., Waukegan, Mich., to cut more-uniform coarse coal as a result of free cutting action. Less drag, it also is noted, reduces miner power consumption. Shoulders minimize wobble, reduce lug wear and keep fines from packing in the lug. The V-R carbide tips are designed to cut faster and stay sharp longer.

Self-Advancing Support

Hydraulically-powered, self-advancing roof supports for longwall applications will be featured in the booth of Mining Progress, Inc., Highland Mills, N. Y. The actual equipment set-up will include a short coal planer with new compressed-air cylinders and other improved equipment.



Metal Removal

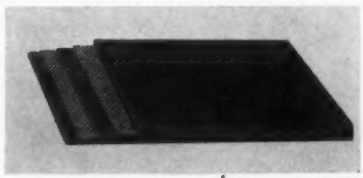
The Model R heavy-duty Arcair torch is designed for high production metal removal. It provides six lines of current contact through its special spring action jaws. Model R may be used with either standard or jointed electrodes with a minimum of electrode changing time. It is available in three sizes: Model R-5 for ¾-in electrodes; Model R-6 for ⅝-in electrodes, and Model R-4 for ½-in electrodes.

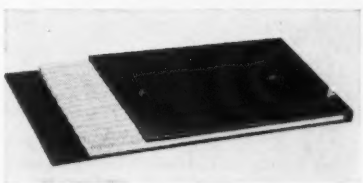
Off-Track Tractor

Model P-1044 permissible tractor by Kersey Mfg. Co., Bluefield, Va., features positive four-wheel drive from two 10-hp motors. The machine weighs 10,000 lb, and is offered for a wide range of duties, including moving mine-power centers, hauling supply tractors, etc.

Ratio Feeder

Described as the latest in the company's series of shuttle-car-to-belt feeders the Model RF 44 Ratio Feeder offered by the Mining Equipment Div., Columbus-McKinnon Corp., Tonawanda, N. Y., features folding hopper walls and adjustable-height wheels to increase the machine's mobility in low-coal mining.





Conveyor Belting

BostRon (top photo) and Flameout 2:00 (bottom) are to be shown by Boston Woven Hose & Rubber Div., American Biltrite Rubber Co., Boston 3, Mass., with BostRon featuring a hazardproof carcass and Flameout, fore-resistance. BostRon is a stronger belt and actually can be made lighter, thinner and more flexible. Flameout 200 has a neoprene-impregnated carcass for high impact and flame resistance.

(Concludes on p 152)

'61 FORD TANDEM AXLE TRUCKS

BROADER WARRANTIES... GREATER DURABILITY... BIGGER CHOICE!

FORD DIVISION, *Ford Motor Company.*

- **New Super Duty V-8 Dealer Warranty—100,000 miles or 24 months!**
- **New extended Dealer Warranty for entire truck line—12 months or 12,000 miles!**
- **New stronger frames and huskier cabs!**

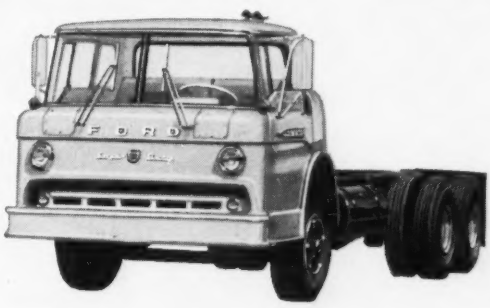
Ford's rigid quality control program gives you unsurpassed dependability! Positive evidence of uniformly high production and inspection standards is the exclusive new 100,000-mile engine warranty. On 401-, 477- and 534-cu. in. Super Duty V-8 engines, each major engine part (including block, heads, crankshaft, valves, pistons, rings), when engine is used in normal service, is warranted by your dealer against defects in material or workmanship for 100,000 miles or 24 months, whichever comes first. Warranty covers the full cost of replacement parts . . . full labor costs for the first year or 50,000 miles, sliding percentage scale thereafter.

In addition, an extended warranty covers all 1961 Ford Trucks of any size. Each part, except tires and tubes, is now warranted by your dealer against defects in material or workmanship for 12 months or 12,000 miles, whichever comes first. The warranty does not apply, of course, to normal maintenance service or to the replacement as normal maintenance of such items as filters, spark plugs and ignition points. No other truck gives you such protection for your investment; never before could you be so confident of long-range durability!

Tougher tandems offer greater strength in chassis, cab and sheet metal for longer life. Full-Torque flywheel power take-off is available for more efficient drive of transit mixers and heavy-duty equipment.

Timken or Eaton rear axles are available in all Super Duty tandems with capacities up to 38,000 lb. High capacity front axles have wider track for increased stability when cornering or in rough terrain.

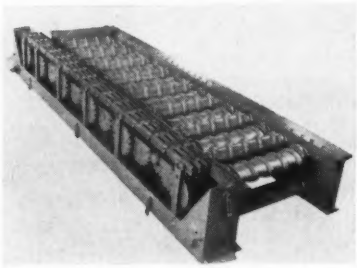
GVW's up to 51,000 pounds permit big, profitable payloads. Heavier gauge metal and stress-isolating independent mounting for radiator, fenders and cab give you greater durability.

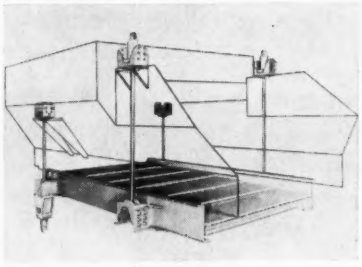


Tilt Cab models are available with tandem rear axles. As with conventional tandems, aluminum walking beams, wheels and fuel tanks are offered to cut weight, boost payload.

QUALITY-BUILT... MAINTENANCE-ENGINEERED

FORD TRUCKS COST LESS

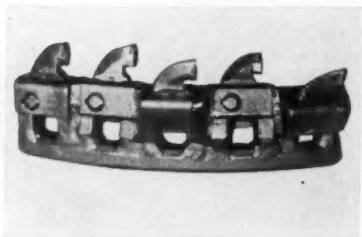




Feeders

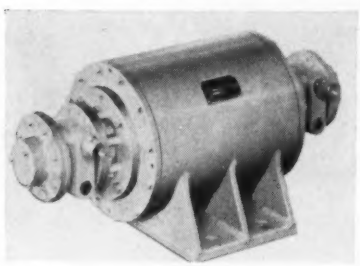
Two feeders are offered by the National Iron Co., Cedar Rapids, Iowa, for coal and other services. One is the 12-in-pitch "Wobbler" unit employing a bed of elliptically-shaped bars. These turn in relation to each other, maintaining the preset spacing and providing a separating action. Low head room, low horsepower and low maintenance are noted for the unit.

The NICO hydrostroke feeder is a pan-type unit said to provide fully controlled feeding action in heavy-duty service. Positive action is attained through a hydraulic ram, and speed is controlled by hydraulic flow to the ram.



BitHoldersforMiners

A new adaptation of the Cincinnati Rap-Lok holder for use on a continuous-miner boring arm is applicable to all boring-type machines, notes The Cincinnati Mine Machinery Co., Cincinnati 20, Ohio. The lugs make for versatility in the choice of bit patterns, and lug compactness provides more positions and enables more bits to be used in a given space.



Bunker Vibrators

Used for the largest shutes and bunkers now built, the DVSD-24,000 Vibrolator develops 12 tons of unbalanced force at 3,000 rpm. The unit weighs 231 lb, and may be equipped for hydraulic or pneumatic drive. Frequency may be steplessly controlled from 0 to 3,000 vpm by regulating the flow of air or oil. The unbalanced force is generated by lead-shot loading, which allows simple power adjustments by removing or adding shot to the eccentric weight, says the maker, Martin Engineering Co., Neponsit, Ill.

Automatic Tramway

Interstate Equipment Corp., Elizabeth 4, N. J., will feature automatic continuous conveying tramways and automatic high-speed reversible disposing and stockpiling units. For a description of this equipment in action see the article entitled, "Automatic Refuse Disposal," in the March, 1961, issue of *Coal Age*, beginning on p 86.

Fluid-Bed Sizing

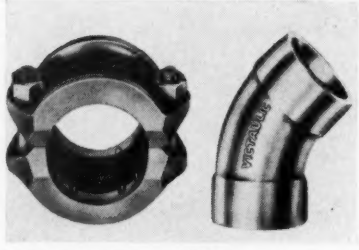
Dorr-Oliver, Inc., Stamford, Conn., will illustrate the application of a fluid-bed unit performing a sizing operation in the thermal-drying section of a preparation plant. The fluid-bed sizer is fed ¼x0 raw coal directly from a secondary crushing operation. A cut is made at 48M in the fluid-bed unit, with minus 48M material being utilized as steam coal and plus 48M material going on to the washing operation. A substantial reduction in tabling and filtration capacity requirements is realized.

Medium-Coal Miner

Offered for medium-low coal by the Lee-Norse Co., Charleroi, Pa., the new Lee-Norse Model CM32 440-V AC miner has a cutting-height range of 36 to 60 in. Equipped with three 50-hp motors (DC also available), the machine is mounted on 16-in-wide crawlers. The cutting-mining operation is the same "rotary-oscillating" action as on other Lee-Norse machines, except that the pivot of the cutter heads is forward of motors and driving gear cases, the manufacturer explains.

Preparation Machines

The Vibroplane, newest Reineveld product to be marketed to the American coal industry by Heyl & Patterson, Inc., is a high-capacity centrifugal fine-coal dryer that virtually eliminates degradation, says the company. The Vibroplane is in successful operation in Europe and soon in the United States. Also to be featured by H&P is the washing cyclone for efficient washing of fine coal, even when it contains a high percentage of near-gravity material.



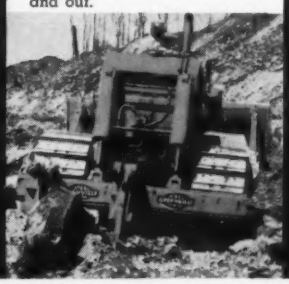
Pipe Coupling

Major feature of the Plainlock Method of pipe coupling developed by the Victualic Co. of America, Elizabeth, N. J., is the fact that Plainlock uses plain-end pipe, eliminating the time and expense of pipe preparation. The method provides a package of leaktight mechanically locked couplings and "Full-Flow" fittings for directional changes and takeoffs, the company notes. The full wall thickness of the pipe is utilized — "an extremely valuable feature in corrosive and abrasive services." Couplings and fittings are available in sizes 1 in through 6 in.

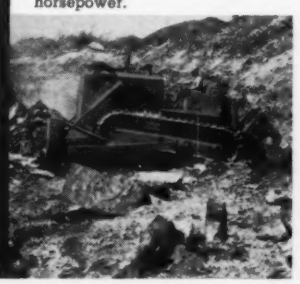
RIPPER ACCOMMODATES ONE, two or three shanks as needed.

RIPPER RIDES CLEAR when not in use. Unit does not limit other tractor uses.

SOCKED TO FULL DEPTH, ripper utilizes tremendous power of TD-25. Rocks pry up and out.



RIPPER WEIGHT balances 'dozer, resulting in greater traction and more usable horsepower.



SLASH STRIP COSTS

Rugged Greenville Rippers mounted on International TD-15, TD-20 or TD-25 tractors get you down to the seam faster and often eliminate the need for explosives. You rip overburden free and push it directly onto the spoil bank.

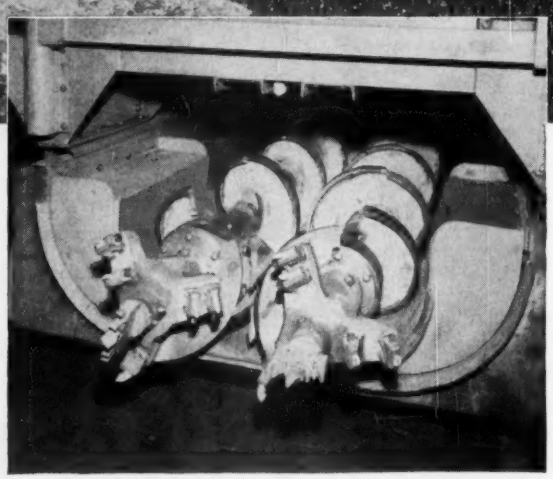
In auger mines your tractor is completely equipped for face-up, pit preparation and road maintenance. Write for Bulletin GR-760 today. It gives complete data on Greenville Rippers and accessories.

GREENVILLE STEEL CAR COMPANY

GREENVILLE, PENNSYLVANIA

NEW...

AUGERS ROTATE IN OPPOSITE DIRECTIONS eliminating the problem of one cutting head climbing over the other. Coal feeds back evenly on both augers, which maintains a better size consistency.



COAL PRODUCTION IS INCREASED by new rib breakers and special cutting heads designed specifically for this Dual coal auger. Holes look like this

DUAL COAL AUGER

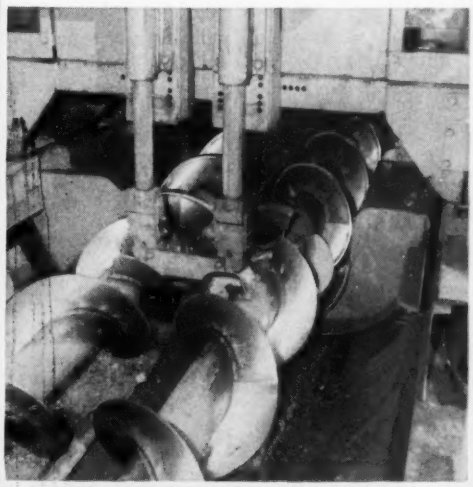
increases profit...
mines low seam coal...
increases recovery...

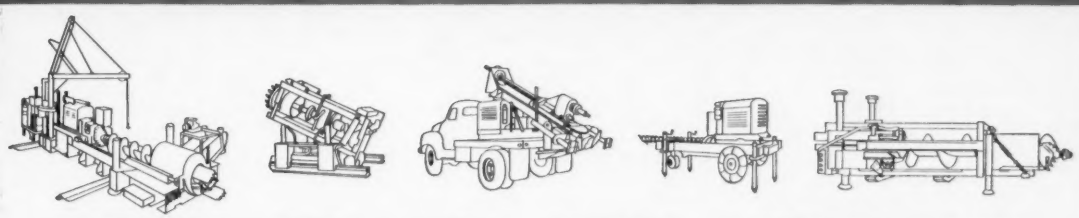
Salem's powerful, new Dual brings low seam coal into the profit class by increasing practical boring depth to 200 feet (100% increase over previous equipment), handling augers from 18" to 30" diameter with only minor machine adjustments, and cutting straight and true in seams only inches thicker than the augers. Coal feeds back along both augers, maintaining the consistency of the size cut. Coal is cleaner and recovery is 50% higher. Your profit is higher. The Dual, like all Salem coal augers, is self-moving. It stores 300 feet of augers in racks on the machine. The operator's view of the highwall is unobstructed.

The Salem Dual is an entirely new concept in coal recovery drills. Investigate it today. Write for Salem Bulletin CR-D61. It gives complete information.

See Salem's Dual Display at the Coal Show • Booth 1708

AUTOMATIC COUPLING AND UNCOUPLING OF AUGERS take place from operators' positions by means of automatic latches. Machine positions augers for fast coupling.





THE SALEM TOOL COMPANY

763 SOUTH ELLSWORTH AVE. • SALEM, OHIO

Union Wire Rope

Tough-job "champs"--Union Wire Ropes and Slings

"Real Gone" from Beatings on the Drum

Even under normal operating conditions, drum wear gives wire rope severe punishment. This wear concentrates at the cross-over points and at the flange. Excessive drum crushing results from operating on small drums, excessive loading and poor winding. Smooth drums are not recommended. Here are typical "drum beatings"; cross-over wear; cross-over crushing on drum; drum crushing from poor winding; drum-crushing from small drum.

Although drum wear cannot be eliminated, its effects can be greatly reduced. Under properly engineered procedures, two and three times the service can be obtained from the same line by improving drum conditions. Union Wire Rope Engineers will help you with this problem.

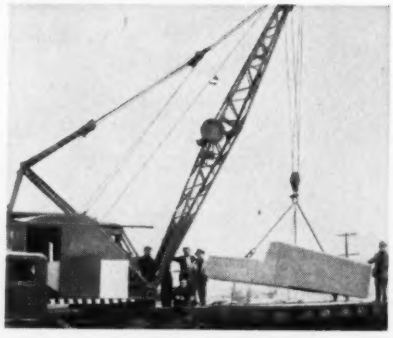
On the "Blink" from a Kink

This open kink resulted from mishandling of rope. Guard against kinks by proper winding on the drum. Never pull a loop smaller. Always enlarge it, then straighten out the rope.

Each Union Tuffy is Engineered to Meet a Different Tough Job

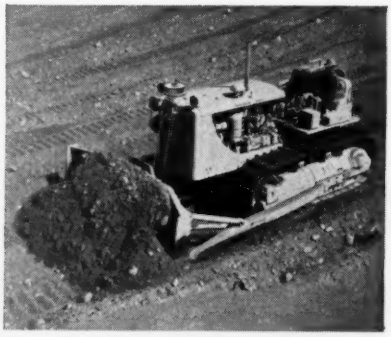
Tuffy Scraper Rope

Flexible enough to take sharp bends; stiff enough to resist looping and kinking when slack; highly resistant to the shock of load impact — that's Tuffy balanced construction. Mount a reel on your scraper—save wasting sound rope.



Tuffy Slings and Hoist Lines

Slings are a patented, 9-part machine-braided wire fabric that is next to impossible to knot or kink. Hoist lines have built-in strength, toughness, flexibility. Balanced—a top-performing team for handling every type of material. In addition to Tuffy, Union Wire Rope furnishes a complete line of slings.



Tuffy Dozer Rope

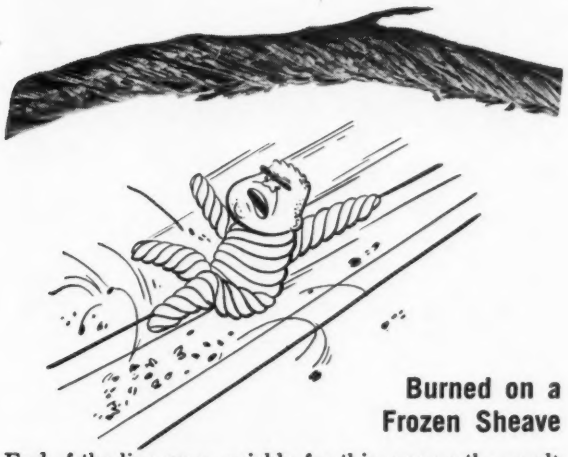
Mounts right on your dozer in a 150′ reel. When rope shows wear, just feed through enough to replace the damaged part. Saves rope, gives you a bonus of extra service. Also available in 300′ and 500′ reels.

Look to the Union Wire Rope Organization for "Right Rope" Service. Union has more than 1600 standard constructions, *plus* the special Tuffy family of wire ropes and slings tailored to exacting special needs. For many years people with special wire rope needs have been coming to Union for help. That's the way the Tuffy family grows. Our research laboratory is at your service. If we don't already have it, we'll design and fabricate just the rope or sling you need. And you'll be sure of Union strength, Union flexibility, Union job-tested quality. Call your Union distributor—see the phone book Yellow Pages.

Tuffy Tips

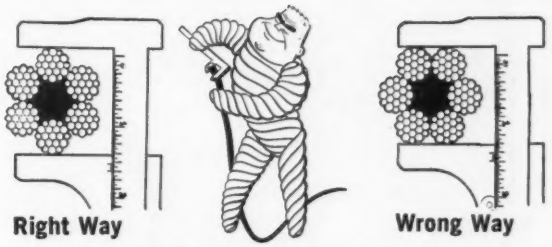
New steels are born at Armco

keep the title longer with proper handling.



Burned on a Frozen Sheave

End of the line came quickly for this rope as the result of operating over a sheave that did not turn. Note the exceptionally heavy abrasion on one side of the rope. Sheaves should be checked thoroughly and often.



How to Measure Rope Diameter

To get the most service, efficiency and safety out of wire rope operation, rope and sheaves must be precisely fitted to each other. There's only one right way to measure rope diameter: use machinist's calipers and be sure to measure the *widest diameter.*

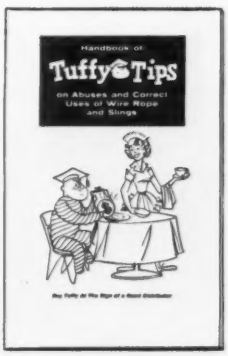
A slight shift of the rope in the calipers, as shown above, will give you a misreading which would result in ordering an undersize rope. Note that the measurement at right shows ⅛" under correct diameter. Be sure to double-check every time!

Tuffy Dragline Rope

High abrasive resistance and super flexibility. Gives long service, dependable action in handling any material—wet or dry dirt, sand, gravel, rock, minerals. Rides smoothly on grooves—hugs the drum when casting for full load.

Union Wire Rope Handbook of TUFFY TIPS... Free!

The "Tuffy Tips" shown here are quoted right out of Union's handbook. In it there are dozens of other priceless hints on the correct use of wire rope. The common abuses and how to avoid them. How to save costly injuries. Maintenance tips. The proper fittings and how to apply them. Recommended sizes. Many other facts and suggestions that will cut down your rope costs and help you get out of wire rope the full service we build into it. No charge. Write Union Wire Rope, Armco Steel Corporation, 2130 Manchester Ave., Kansas City 26, Missouri.



2-61

ARMCO Union Wire Rope

Foremen's Forum

TOP MANAGEMENT backing and follow-through are essential ingredients in safety success.

Honesty in Safety Work

Top-management backing from sincerely interested executives results in a virile safety program that accomplishes desirable results. Good rules, rigidly observed, are the key.

DO IT RIGHT . . . every time.

C. J. Flippen
Labor Relations Advisor
Charleston, W. Va.

THE WORD honesty may be used to denote anything from frankness to sincerity. However, I shall try to tie it in with successful safety endeavor as being a virtue which is indispensable. I shall also attempt to show that it is not always used. Perhaps the lack of it is not always realized, but no matter how much charity is granted the effect is unchanged.

Planning for safety is meritorious, but dreaming has limitations in that we may rationalize a dream as truth in fact. We should approach this subject in a realistic manner with the knowledge that many safety programs have failed of success simply because while we were dreaming we forgot human emotions, quirks of nature and motivations.

Mr. Flippen, now retired, was labor commissioner for Kanawha Coal Operators' Association.

The main thing with which we are concerned in industry today is human engineering. We once thought that if our mines met certain physical standards success would be sure. But we find mines with very bad physical conditions having better safety records than mines with good conditions. Times and ideas have changed, and only those who are willing to change with them can have a measure of success in safety. This observation does not mean that I am in accord with all prescriptions that have been advanced as cure-alls in the past.

While confining my remarks to safety I shall mention some situations where insincerity has spoiled progress in programs which at first were conceived in all honesty and with the best of intentions.

We can make a set of rules covering virtually all phases of a mining operation, and, after study and approval, they are adopted as operating standards. We get after the miners to support roof in accordance with the rules and to keep

BULLETIN:

Shell now offers a fire-resistant hydraulic fluid of superior quality—and at comparable cost to flammable hydraulic oil

By mixing Shell 3XF® Mine Fluid with ordinary drinking water—right at the mine—you get an effective fire-resistant hydraulic fluid at the lowest possible cost.

Here is the story behind this historic new product of Shell Research—the first fire-resistant hydraulic fluid to be approved by the U. S. Bureau of Mines under Schedule 30.

Fire-resistant hydraulic fluid can be made at the mine by mixing ordinary drinking water with 3XF Mine Fluid.

WITH THE development of Shell 3XF Mine Fluid, the danger of underground mine fires can be greatly reduced.

How 3XF was developed

The scientists at Shell Research started with two basic facts. Mineral oil, they knew, is an excellent hydraulic fluid. But it burns.

Water is an excellent fire extinguisher, but not the best lubricant.

Why not find a way to combine the two? Oil for lubrication, water for safety.

> *The result of their effort was a unique kind of water-in-oil emulsion. Droplets of water were literally encased in the oil. The final product: Shell 3XF hydraulic fluid.*

The oil lubricates. The water provides all-important protection against fire.

How it was proved

Exhaustive tests of 3XF hydraulic fluid proved its effectiveness—under fire.

Even when sprayed into a flame, 3XF hydraulic fluid would not create a fire hazard.

However, safety alone was not enough. 3XF hydraulic fluid also had to work in existing mining machinery. And it would be most desirable if it could be compounded *at the mine.*

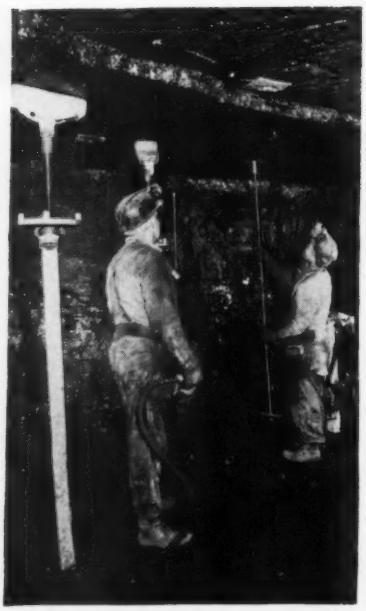
So, Shell Research developed a special concentrate called *3XF Mine Fluid.* Blend 40% drinking water into 60% concentrate—mix well and the product is ready for use.

On February 18, 1960, Shell 3XF Mine Fluid ushered in a new era of mine safety when it became the first fire-resistant fluid approved under U.S. Bureau of Mines Schedule 30.

For complete data about 3XF Mine Fluid, contact your Shell Industrial Products Representative. Or write: Shell Oil Company, 50 West 50th St., New York 20, N.Y.

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are working to provide better products for industry.



OBSERVE established rules.

clearance in their working places. We inflict discipline for infractions. On our part, we may not maintain clearance along the roadways back of the faces, or we may not keep haulways supported in line with the rules, refuge holes are nonexistent, the superintendent and foremen may be seen taking liberties with the rules, supplies arrive late, or the wrong supplies arrive.

The superintendent wonders why his safety program doesn't succeed. He has a set of rules, so why doesn't it? The willingness of mine officials to abide by safety rules is an indication of whether they mean to enforce safety or not—whether they are really sold on it. Plain dishonesty creeps into a situation like this and kills a well-intentioned program We are not sincere when we expect the miners to observe rules which we are not willing to obey ourselves.

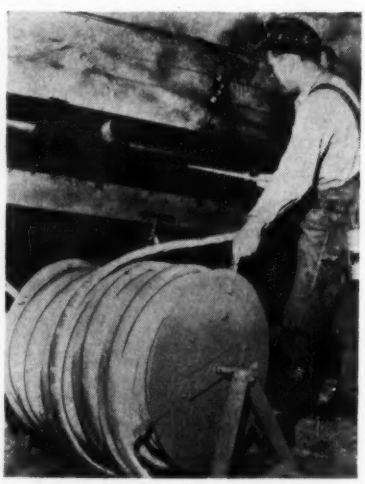
Admittedly, many sets of rules have a lot of dead wood in them—stipulations that cannot be enforced. When rules are adopted they must be observed or thrown away entirely if any good is to be expected. One of the worst features of rule-breaking by officials is that it results in a let-up on enforcement and discipline; everyone begins to break them. Non-enforcement of rules is taking the easy way out of a sometimes difficult situation, but it does nothing for safety.

Habit operates either to our advantage or disadvantage. It is the flywheel of society; it alone keeps us within the bounds of rules and ordinances. The habit of staying safety-conscious, of keeping safety paramount and of doing all the necessary things to achieve and maintain safety will eventually cause safety to be first—exactly as we advertise it in posters and newspapers and by word of mouth. It is absolutely dishonest to claim that we want safety, then by slipshod habits and inattention to the safety department let violations of rules and dangerous practices become common. Good safety habits are required throughout the organization, from laborer to president.

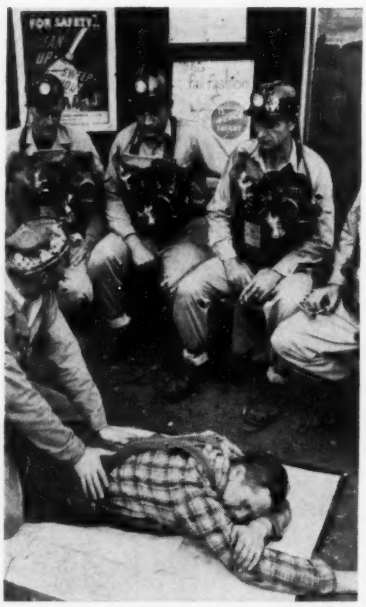
Who is responsible for safety honesty? Each man from the top man down, but especially the top man. If he fails to do his part the whole structure falls. If he gives all his time and talents to production and pays no attention to safety he can expect only failure, followed by the high costs of compensation. When the top man fails to back up safety we find a dozen little plans going at the same time where one workable plan is enough. We find confusion rampant, where more orderly procedure would lead to success.

One cheap and dishonest trick which never pays is to transfer or fire a foreman when he has had an accident on his section; that is, when no investigation has been made to determine responsibility. Another way of trying to fool ourselves is to have a capable safety department and relegate it to the basement, pay no attention to it except to shoo it away when it becomes bothersome, and not recognize it as on a par with the operating department. The same amount of intelligence is required to run a successful safety program, since safety men must also be able to handle the jobs in the operating department.

Loyalty may not be valued as highly as it once was, but perhaps that is because we do not inspire it enough. It must flow from us before it will come back. Do we try to inspire it by acts of our own, or do we think we can get it through oratory and posters? I have never seen a safety-conscious group without loyalty, and when we expect it without inspiration we are thinking without sincerity.



EQUIP and maintain for safety.



PROVIDE necessary training.

Some coal men think that general safety meetings are beneficial, others disagree. I know that they help, provided a correct attitude is maintained by management in reporting unsafe conditions and practices by employees who take part in the meetings. If we hold the meetings merely to please inspection agencies and do not take steps immediately to correct unsafe conditions reported at the meetings, we are not sincere in this phase of safety work.

When either a mine official or labor official states publicly that he is in favor of safety, then does nothing to indicate his interest, he lies in his teeth. There are some things a top manager cannot delegate, and one of these is real interest in safety. He can inspire it but not delegate it. You can't have a successful revival without the preacher.

We should try to avoid wishful thinking. We all want safety, we know it is a good thing. It pays from every angle. It promotes good feeling. My plea is that we be honest in dealing with safety; that we get away from hackneyed phrases in talking about it; that we develop true understanding of its opportunities and problems.

CAT 966 WHEEL LOADERS

...working mobility for the load-and-run jobs

The stockpiles are scattered all over the Glen Alden Corporation's Wanarie No. 19 strip mine. Stripping and hauling out the anthracite coal is done by J. B. Corgan of Kingston, Pa. He needs a loader that can fill a 15 yd. truck and then run to another stockpile and load again. A power shovel couldn't give them the mobility, and a few years ago they switched to wheel loaders. Last June they switched again—to the new Cat 966.

"We picked a big 966," says Bill Corgan, "because of its fast power shift transmission, the automatic bucket controls and its safety—with the lift arms up front. The 966's dual-ratio steering is a feature that fits our job perfectly too. The operator can use that fast ratio for loading (a half-twirl of steering wheel puts the loader in full turn), then for running to another stockpile, he shifts to travel ratio (loader steers with normal automotive response). And I'd say there was one other reason for our choice of the 966—we're not strangers to Cat dependability."

Yes, it's a logical choice for jobs requiring fast moves *and* high production. With the 966's 4 yd. coal handling bucket, you're offered a loader that can give you *up to 5000 tons per day capability*. Easy operating features are behind that figure: AUTOMATIC BUCKET POSITIONERS set the digging angle, lift and hold the bucket, speed up any operator's cycle; and POWER SHIFT TRANSMISSION provides on-the-go shifting, forward and reverse, first and second speeds.

If your job calls for mobility or high production or *both*—see your Caterpillar Dealer. He'll show you the full line of Cat wheel loaders—140 HP 966, the 105 HP 944 and the 80 HP 922. And he'll show you the attachments, special material buckets, side dump buckets, snow plows and bulldozers that can equip your loader for the necessary side chores. Call your dealer today and see the loaders with production and safety features no others can match.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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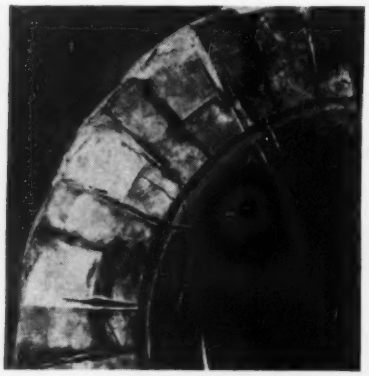
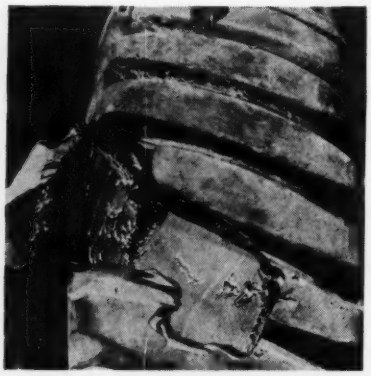
THE 966—
FIRST IN MOBILITY—
FIRST IN PRODUCTION

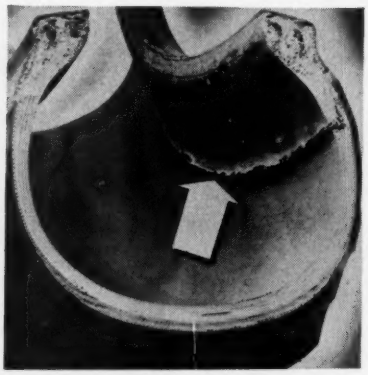
Operating Ideas



UNDERINFLATION causes radial cracks.



OVERINFLATION caused this blowout.



OVER LOADING caused this flex break.

Tips For Longer Tire Life

MODERN TIRES make possible faster speeds and cut the cost of operations. But these savings can be offset by improper tire care, says International Harvester Co.'s Construction Equipment Division.

Daily tire inspection is the key to longer tire life, the service men note. The accompanying illustrations, supplied by Goodyear Tire & Rubber Co., and the following list of suggestions are offered as a guide to getting more life from your tires.

1. Check tire pressure when the tires are cool, using a low-pressure gage with 1-lb. graduations. If a tire is found considerably underinflated, don't operate the vehicle until the leak is located and repaired.

Underinflation causes rapid wear on the outer edges of the tread and excessive flexing, resulting in the building up of internal heat. Blowouts frequently result.

Continued underinflation results in radial cracks. Overinflation causes rapid wear at the center of the tread and often leads to sidewall breaks.

Do not bleed tires if pressure builds up during the day. The added pressure automatically compensates for the additional heat by preventing sidewall flexing, which would generate more internal heat.

2. Repair cuts that penetrate to the cord immediately before they have a chance to spread. Skive shallow cuts with a knife or bullnosed rasp to prevent small stones from becoming imbedded and working through the cords.

3. Check rims and flanges for damage.

SKIVING prevents stone penetration.

If tires are dismounted for repair, clean and paint the rims to make mounting easier and to prevent rusting. Remove oil or grease found on rim assemblies immediately to prevent deterioration of the tire.

4. Remove caked mud and rocks from tires, especially from between rear duals.

5. Check tires for uneven wear and correct the cause as quickly as possible.

6. Avoid mismatched tires on dual assemblies and ensuing unequal load distribution. The new larger tire wears rapidly and the smaller tire usually scuffs severely. If it is necessary to use a smaller tire, place it on the inner position.

7. Provide good haul roads. Steep grades and sharp turns cause slippage which shortens tire life. Loose or embedded rocks increase the possibility of cuts and impact damage.

8. Store tires properly. Tires and tubes stored improperly can age more rapidly than those in daily service. Light, heat, oil, dust and moving air cause deterioration. The following procedures are important:

(a) Store in a cool, dry, dark area protected from the wind.

(b) Do not store tires in the same area with gasoline or lubricants. Even vapors can be absorbed by the rubber, with rapid deterioration resulting.

(c) Pile tires on a wood foundation to keep them off dirty, oily floors. Keep the same sizes together and never place a larger tire on a smaller one.

(d) Protect tires stored outdoors with a waterproof cover. Keep water and oil from the inside of the casing. A sure method of preventing this is to mount the tires on wheels with air pressure reduced 50% and then cover them with a tarpaulin.

9. Buy new tires in fall or early winter for longer tire life. Tires that run all winter will have thinner treads the following summer and therefore will run cooler. New tires with heavier treads run hotter, wearing down approximately 30% faster.

10. Watch for overloading. A 20% overload drops expected tire life by 30%. And when the overload is 100%, only 25% of normal tire life can be expected.

NEW PLASTIC SHELL CASE

Now standard on all Republic Bail-Type Roof Bolts

Already a preferred product among leading mine operators, Republic Mine Roof Bolts now offer another new, advanced feature—polyethylene shell cases for bail-type bolts. Standard on all Republic Bail-Type Roof Bolts at no extra cost.

PROTECTS SHELLS IN STORAGE—SIMPLIFIES HANDLING AND INSTALLATION. The new shell case is unaffected by moisture and corrosive conditions often present in mine storage areas—protects against shell damage and lost parts. The plastic case can be left on the shell when installed, makes installation faster and easier.

RED SHELL CASE—MARK OF QUALITY. Republic Bail-Type Roof Bolts can be identified at a glance. The bright red shell case, a Republic exclusive, tells you that it's a Certified Quality Republic Bolt. Steel chemistry, yield point and break point are known quantities for predictable, top performance at lowest cost.

To meet specific conditions in your mines, Republic offers the largest selection of roof bolts available anywhere. Field trained Republic Mine Roof Bolt Engineers are available to work with you in selecting the best bolt for your requirements. Send the coupon for more information on Republic Roof Bolts and obligation free field service.

REPUBLIC STEEL

REPUBLIC HAS THE FEEL FOR MODERN STEEL

REPUBLIC STEEL CORPORATION
DEPT. CA-2131
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send further information on:

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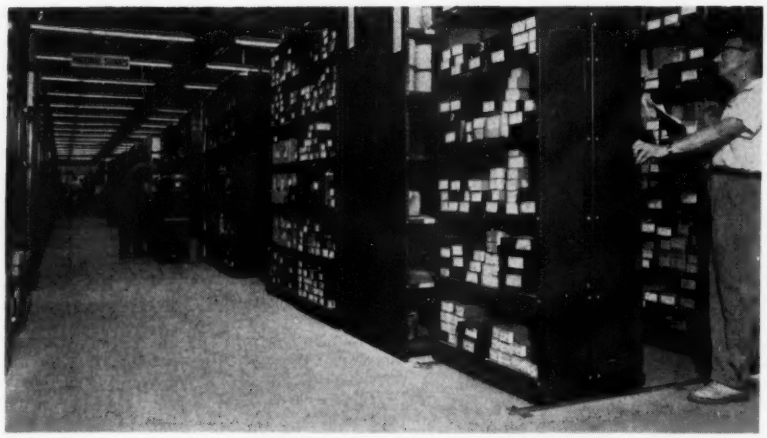
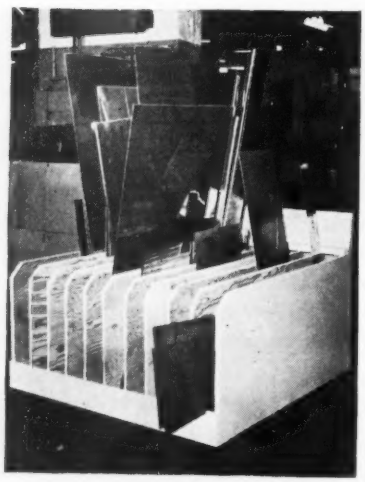
Mobile Shelves Save Space

MOBILE storage bins cut space requirements by 40%, according to *Factory*, another McGraw-Hill publication. Standard steel shelves were modified by maintenance crews to permit them to ride on steel tracks secured to the floor. Now one aisle is needed to provide access to seven or eight rows of shelves.





Traveling Racks Store Sheet Metal

THESE wooden storage racks on wheels have solved a waste problem at Aeronca Mfg. Corp.'s, Middletown, Ohio, plant according to a recent issue of *Factory*. In the past aluminum sheets were tossed into the scrap bin after the punching operation. Even though some sheets were large enough to salvage there was no place to store them.

The plant-made rack proved to be the answer. When a piece of metal is large enough to salvage, it is just as easy to place it in the rack as to toss it out. A similar rack for your preparation plant or central shop might prove to be a means of salvaging and storing sheet metal used on assorted repair jobs. The rack shown above has 10 compartments which make it possible to keep the pieces grouped into similar sizes. It can be made of 1- and ½-in plywood.

Removing Wood From Cone Washer

A SIMPLE MEANS of eliminating wood from the clean coal circuit has been devised by T. Emrys Smith, manager of the National Coal Board's Cwm preparation plant, according to *Iron & Coal Trades Review*.

Mr. Smith's idea calls for cutting an opening 9½ in wide in the side of the Chance cone. A short water chute attached to the outer side of the opening is arranged so that the bottom of the chute is 2 in below the normal water level in the cone. The chute discharges onto a specially fabricated vibrator.

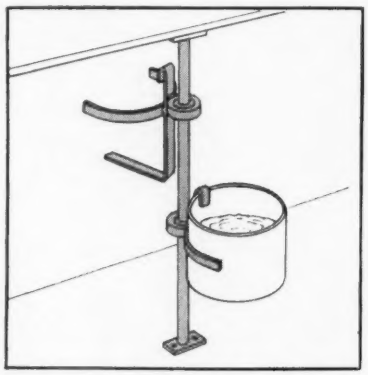
When the cone is operating, the water flows out of the opening onto the screen, carrying any timber over a ½-in wide mesh and discharging it into a chute while the water, with some sand, flows to the sand sump. By inserting this device into the clean-coal circuit, the plant eliminates trouble at the crusher.

Storing Volatiles

RESEARCH and control chemists need a place to store safely volatile chemicals and the domestic-type refrigerator fills that need, writes Lindsey Hoben, Oak Ridge, Tenn. But, he warns, unless certain changes are made an explosion can take place.

As a result of an occasional explosion that ruined the box and damaged adjacent equipment, changes were made to prevent future accidents. All refrigerators assigned to the laboratory now are sent to the electrical shop where the switch for the interior light is relocated on the exterior and the relay controlling the compressor is relocated near the motor to eliminate sparking in an explosive atmosphere.

As a final precaution, Mr. Hoben recommends replacing the two-conductor power cord with a three-conductor type to provide a medium for grounding the box against the possible hazard of it becoming "hot" because of an insulation breakdown. A label on the converted box explains the safety features but warns that only one day's supply should be stored in it and all open containers must be covered.



Cleaning Tanks

HANDY cleaning tanks that swing out of the way when not in use can be made from scrap material, according to *Fleet Owner*, another McGraw-Hill publication. Tanks can be made from empty grease drums. A strap iron bracket holds each tank by hooking over the top edge and supporting the bottom. Weld the bracket to an old thrust-type bearing. Then weld bearings and brackets to a pipe secured to floor and bench. Slant the pipe slightly inward so the tanks will stay under the bench when they are not in use despite hammering.

"JFI Positive Performance Feeder cuts costs six ways at Wyatt-Seanor Mine."

Says John Harvey, Superintendent, Wyatt-Seanor Mine, Simpson Coal and Chemical Corporation.

Simpson Coal and Chemical increased production *and cut costs* when they installed a JFI *positive performance* Feeder in their Wyatt-Seanor Mine in Western Pennsylvania. John Harvey, Wyatt-Seanor Superintendent, reports: "The JFI Feeder allowed us to more fully utilize belt capacity by conveying more coal at slower belt speeds—100 f/p/m *less* than before. Belt wear was noticeably reduced.

"We were also able to eliminate mainline belt spillage from the feeder point to the outside of our mine, and now there is no need to attend belt transfer points. Many man hours are being put to use at more productive jobs. Elimination of surges and overload conditions has reduced mechanical maintenance on belt drives and cut horsepower requirements on those drives."

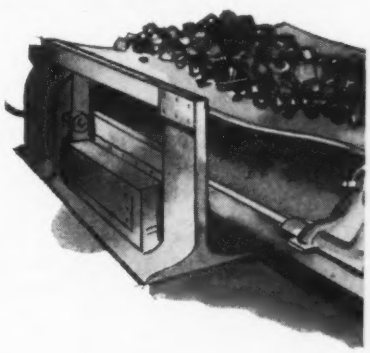
JFI *Positive Performance* allows high shuttle car discharge rate, complete flexibility of reduction ratio, and profitable multiple belt operation. Feeders are available for both coal and ore mining operations.

If you're after increased production at lower cost, check JFI's complete design and advisory service.

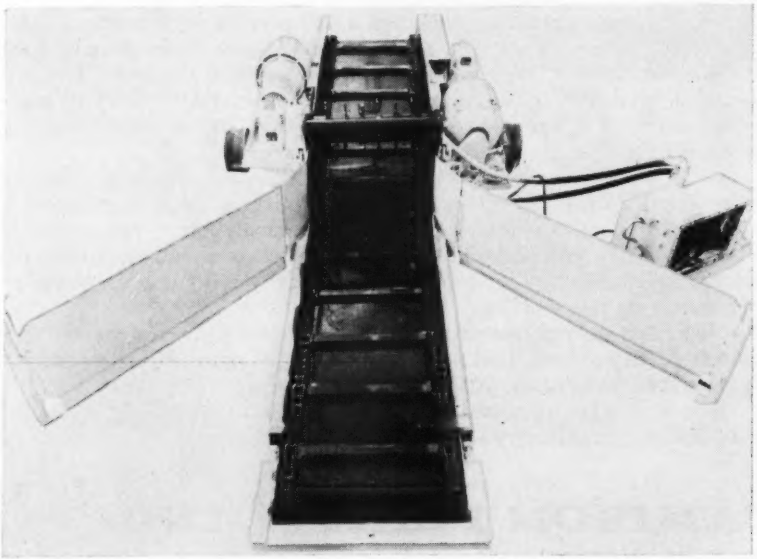
Write today for free literature.

JAMISON FEEDER, INC.

HUNKERS, PENNSYLVANIA TELEPHONE: WAlker 5-7200



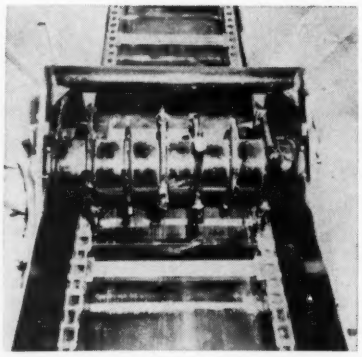
New Equipment News



Unit Limits Lump-Size Feeding

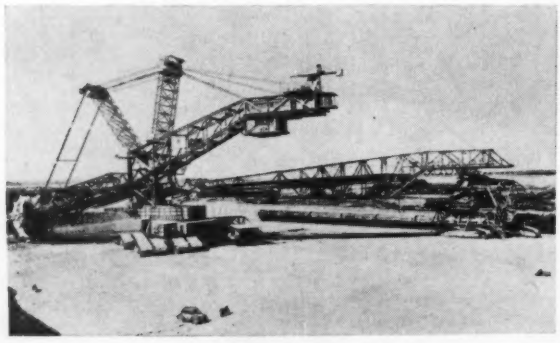
The problem of handling excessively large lumps of material on belt conveyors is eliminated with the "Rosco" feeder-breaker, according to the manufacturer, Long-Airdox Co., Box 331, Oak Hill, W. Va.

Consisting of two separate elements—a feeder-type chain conveyor, normally with a 40-in through width, and a rotary breaker, the combined unit is designed to limit the lump-size feeding on the belt conveyor, eliminate spillage at the tail section and load the belt evenly without surge loading. It is driven by two motors, one each for the conveyor element and breaking element, with both motors controlled by a single-combination starter. The Feeder-Breaker is reported to increase belt capacity, allow higher belt speeds and wider idler spacing, permit multiple loading points and minimize maintenance and cleanup labor.



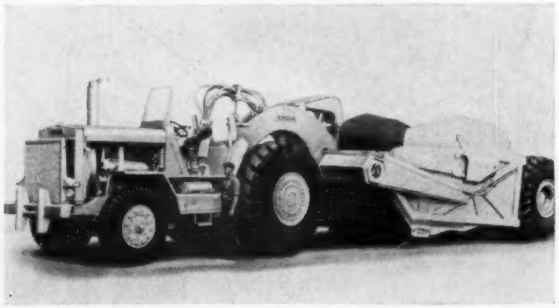
It is applicable also to all shuttle car mining systems regardless of seam height and is said to reduce effectively the size of lump material to recommended maximums of 10 to 12 in for a 30-in belt, and 12 to 14 in for a 36-in belt. A shuttle car can normally dump its entire load at maximum rate into the feeder-breaker and the material is reduced to the desired size. The load is fed at a reduced rate onto the belt.

Photo at right shows staggered arrangement of hammerlike heads that reduce lump material to recommended sizes. Various models are available for varying conditions and seam heights.



Excavators, Reclaimers and Stackers

This bucket-wheel excavator is a medium-sized member of the line of West German excavating, reclaiming and stacking equipment built by Demag-Lauchhammer of Duesseldorf. With a capacity of 4,900 cu yd per hr, this machine has a service weight of 2,950 tons. Bucket wheel diameter is 45.9 ft; height, 150 ft; length, 525 ft and total installed motor rating, 5,230 hp. Wellman Engineering Co., an affiliate of Cleveland's McDowell Co., Inc., has been granted an exclusive license to sell and manufacture the Demag- Lauchhammer line in the U.S.A. and Canada. The excavators and stackers are available in a wide range of capacities up to 20,000 cu yd of material per hr.



40-Yd Scraper

Many innovations have been incorporated in the Model SS-40 6-wheel scraper announced by Euclid Div., General Motors

YOU'LL NEVER BURN OUT AN AIR TOOL

with the new Le Roi LO-380 line oiler...

EMPTY OILER SHUTS OFF AIR!

Here's how the LO-380 Saves Tools—Cuts Repairs!

(1) Inlet reed valve meters air into the oil-resistant bellows

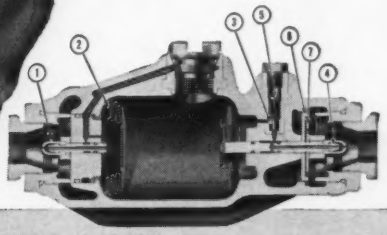
(2) which creates pressure that forces regulated amount of oil through porting connected to the needle valve (3) and the porting connecting it to the outlet reed valve

(4) through which oil is injected into the air stream.

(5) Set screw permits easy external adjustment of oil feed during operation.

(6) Positive pressure differential valve assures correct oil feed for all air flows — eliminates oil waste.

(7) Shut-off valve automatically stops air when oiler is empty. As oil supply goes down, bellows (2) expand and contact the shut-off plunger, depressing it until the valve reaches the automatic shut-off position.



That's right! *You'll never burn out an air tool with the new Le Roi LO-380 on the job!* When the oiler runs dry, it automatically shuts off the air! The "no oil — no air" design prevents unnecessary wear on critical parts — cuts repair bills — extends tool life!

The new line oiler assures positive lubrication for air tools — delivers a steady mist of oil at 10 to 150 psi — and keeps it flowing until you shut the air off, or until the empty oiler shuts it off automatically. Metered oil flow provides exceptional economy, prevents oil splurges. As a matter of fact, the LO-380 will pay for itself in a short time through oil savings alone!

Oiler permits easy external adjustment of oil feed — provides full one-pint capacity. Lightweight—only 9 lbs.—it's easy to use, easy to move—operates in any position. Oiler can be refilled under pressure while air tool is in operation.

Contact your nearest Le Roi distributor for details—or write to Le Roi Division, Westinghouse Air Brake Co., Sidney, Ohio.

LE ROI NEWMATIC® AIR TOOLS

PORTABLE AND TRACTAIR® AIR COMPRESSORS • STATIONARY AIR COMPRESSORS • AIR TOOLS

AT-906

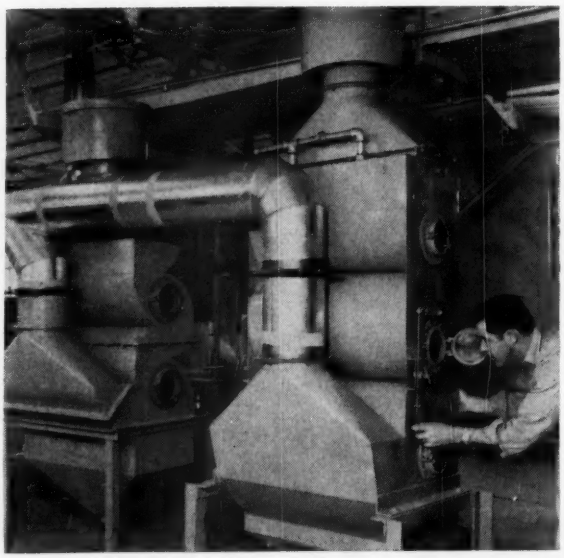
Distributed in the Coal Fields by: Acme Machinery Company, Huntington, West Virginia, and Equipment Service Company, Inc., Birmingham, Alabama.

Corp., Cleveland 17, Ohio. Payload capacity is 125,000 lb; struck capacity, 40 cu yd, with an S.A.E. rating (heaped at 1:1 slope) of 52 yd. Designed for high production jobs with long, high-speed hauls to 34 mph, the SS-40 is powered by a GM 12-cyl, diesel engine (12V-71) of 432 hp driving through an Allison Torqmatic drive. All scraper operations are completely hydraulic with no cable connections. Completely new feature is the double ram actuated "push-out, roll-out" ejector, providing extra force at the beginning to overcome inertia with maximum speed at the end of the stroke and a final snap action for fast, clean shedding of the load. A radial-design power apron is another innovation. Width of cut is 11 ft 4 in and maximum depth of cut is 14 in. Tractor of the SS-40 can be quickly attached to a Euclid bottom dump with 40-yd struck capacity.

Dust-Control Products

The Johnson-March Corp., 3018 Market St., Philadelphia 4, Pa., has developed a bulk-material conditioner and variable-orifice, wet scrubber which permit dust-free handling of powdery, finely-divided materials. Improved compounds providing better protection for outdoor storage of bulk materials also were announced.

The "Verticone" conditioner suppresses dust by adding a precisely-controlled amount of moisture into the finely-divided material. Key to effective conditioning is controlled wetting of all surfaces of each particle with an extremely powerful surface active compound, called Compound MR.



Pictured here is the "Hydro-Volute" scrubber with air volume control. This scrubber develops high scrubbing efficiencies on a wide range of fumes, dust and odor problems despite substantial variations of air or gas flow. Scrubbing efficiency of fixed orifice scrubbers drops off substantially as flow is decreased.

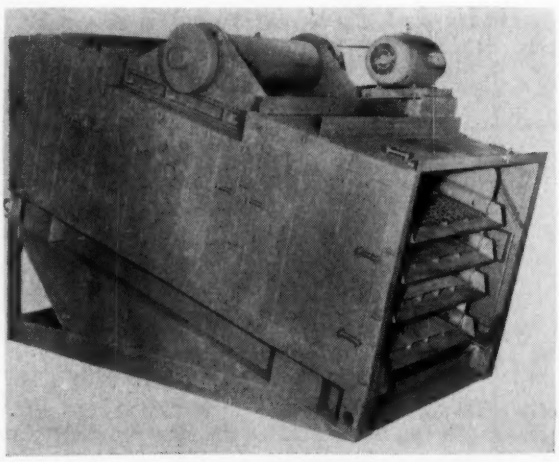
Tractors and Loader

Three new series of industrial tractors—the "2000," "4000" and "6000"—and a new front-mounted loader are being produced by the Tractor and Implement Div. of Ford Motor Co., Birmingham, Mich.

The "2000" and "4000" feature a cast steel one-piece front axle rated at 5,000-lb capacity, power steering, foot throttle, comfort seat, and rugged rear axles. Both use Ford's "Red Tiger" 4-cyl, in-line, overhead-valve engines and are available with diesel, gasoline and LP-gas fuel options. The "4000" (photo) uses a 172-cu in displacement engine for all three fuels while the "2000" boasts 134-cu in displacement for the gasoline and LP-gas models and 144-cu in displacement for the diesel. Four transmission options are offered on both models.

The industrial loader, designated the "720," recommended for installation on the "4000," has a 2,000-lb lift capacity and 4,000-lb breakaway capacity. Cycle time for the loader is 12 sec for load, raise, dump and return to loading position.

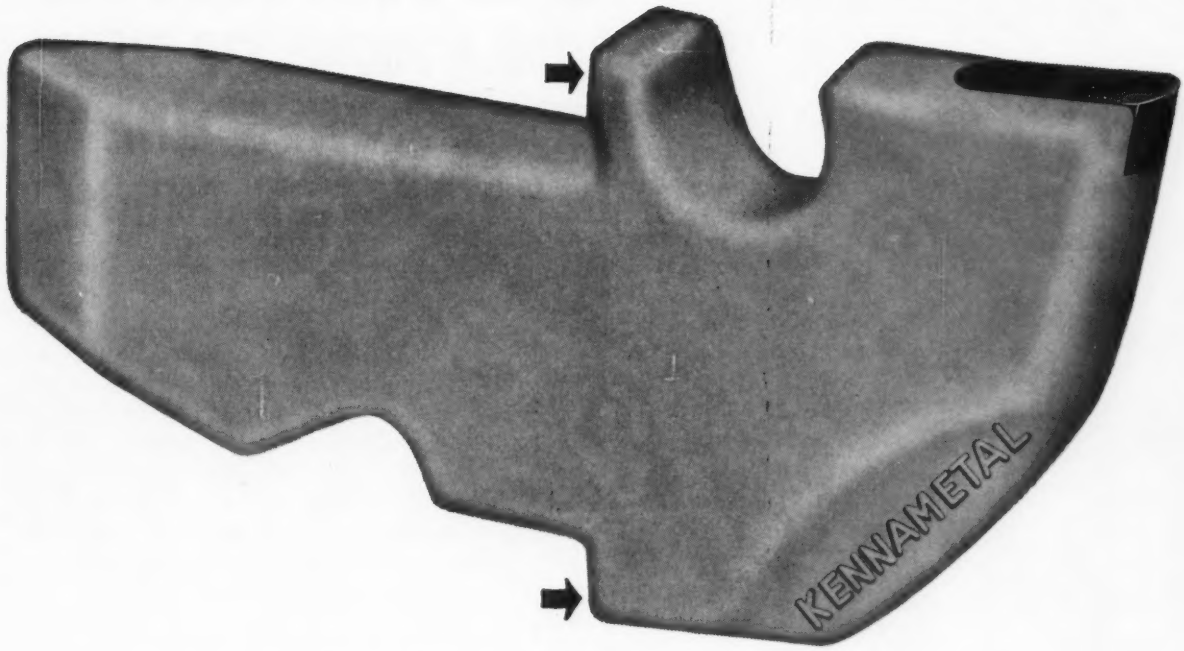
Ford's "6000," weighing over 6,500 lb, is a 6-cyl tractor and the largest tractor Ford has ever produced.



Vibrating Screen Enclosures

Fully-enclosed models of Deister vibrating screens, affording maximum dust protection yet permitting ready accessibility to all working parts, have been announced by Deister Machine Co., 1933 E. Wayne St., Fort Wayne 4, Ind. Fabricated of heavy-gage steel held in place by swing bolts, the enclosure panels can be removed in a mater of seconds for adjusting screen tension and changing screening medium, according to the company. Hinged top panels are said to be equally easy to open. Introduction of these enclosures follows recent engineering improvements in Deister's screen suspension systems now featuring a heavy box-type H-beam base (integral with the screen) plus enclosed spring and rubber mounts. Enclosures can be furnished on any screen in the Deister line.

new...KENNAMETAL U21 BIT



dual gage shoulder design
. . . plus new achievement in dimensional control

Rigid dimensional control is the most important feature of the new Kennametal U21 Cutter Bit. Here's why:

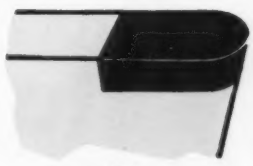
• **CLOSER TOLERANCES** assure a tighter fit and provide greater stability of the bit in the block. This, in turn, means less "pounding" or deformation of the tool holder, and less flexing of the rubber keeper with resultant longer life. Firm positioning against the work provides more positive cutting action.

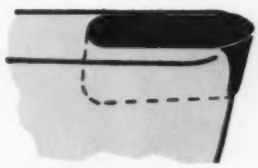
• **DUAL GAGE SHOULDERS** provide front and rear bearing areas to absorb the shock forces encountered in severe cutting conditions.

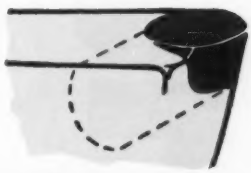
• **PULL-OUT NOTCH,** replacing the pull-out shoulder, is located to permit easier, safer extraction of tools from blocks on ripper-type chains. Bits are removed quickly . . . which saves you time and money.

Now's the time to prove, in your mine, how the new dual shoulder, quick-change Kennametal U21 will stand up under the most rugged cutting conditions. Let the Kennametal difference in quality and design show up in performance—more production—greater profits. Call your Kennametal representative or contact us direct. KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania. Phone 623-5134.

The new U21 Cutter Bit is available in three standard tip styles. Ordering designations are U21RA, U21R, and U21. 34225


U21


U21R


U21RA

U21
Full Nose Radius Style

U21R
Recessed or Channel Style

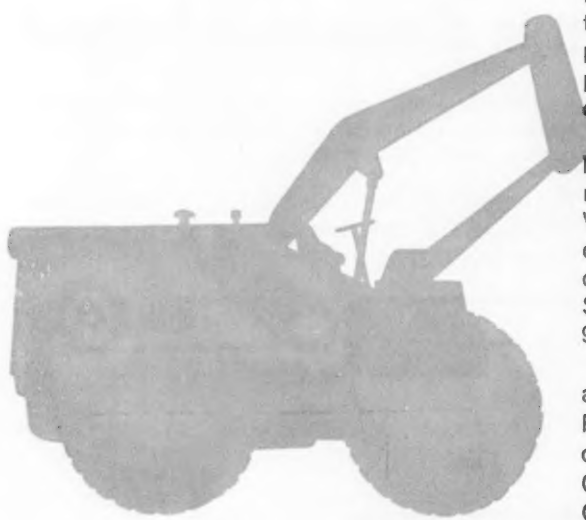
U21RA
Cylindrical Plug Style

See our display at the Coal Show—Booth 1818

KENNAMETAL
...Partners in Progress

CUMMINS

ADDS A 700HP V12 DIESEL TO A GROWING LINE OF CONSTRUCTION ENGINES



Newest of the V diesels from Cummins is the VT12-700. A real workhorse. It's big in horsepower, but not in size. Truly the most compact, most powerful highspeed engine on the market. And turbocharging permits full rated horsepower up to 10,000 feet.

Like the VT-700, the new, naturally aspirated V12-525 has features that will reduce operating costs. Both 12 cylinder engines have internal fuel and oil lines which eliminate damage to exposed tubing and connections. The revised PT fuel system automatically compensates for wear—needs only the simplest maintenance. A basic block improvement gives you a stronger, more durable engine.

The increased power of these new diesels is a natural advance from the famed VT-600 and NVH-450. For more than ten years these two models have had the field to themselves. Only Cummins could better their proven performance. How? By redesigning the cylinder area to permit higher horsepower at no increase in engine size *or engine wear.*

This big bore feature is also part of the V diesels at the lower end of the line . . . the V8-350 and the VT8-430. All new, all power from the pan up, they're the first 8 cylinder V diesels in this horsepower bracket built specially for construction equipment. Every kind of application, every operating condition was considered in their design. Service is easy because all accessories are mounted in the 90° angle between the cylinder banks.

Be assured of continued low operating costs with Genuine Cummins Parts and qualified service. For the complete profit story, see your Construction Equipment Dealer or Cummins Distributor.

CUMMINS

COME SEE US AT THE COAL SHOW
CUMMINS EXHIBIT 2013

U.S. NATIONAL IMPRINT

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

International Sales & Service • Cummins Diesel International Ltd., Nassau, Bahamas • Cable: Cumnas
Overseas Factory • Cummins Engine Company Ltd., • Shotts, Lanarkshire, Scotland 6-17-60

V8·350 HP

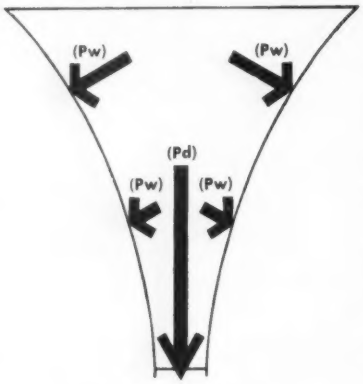
VT8·430 HP

NVH·450 HP

V12·525 HP

VT·600 HP

VT12·700 HP



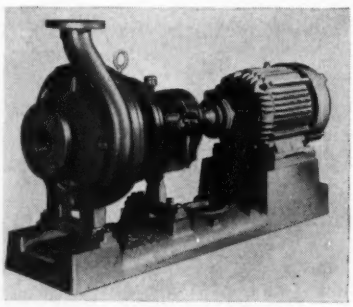
New Bin Outlet Design

The new Bin-Dicator Hyperbolic Outlet assures free, full, uniform flow of granular and lumpy material from bins, hoppers, silos, etc., according to the manufacturer, Bin-Dicator Co., 13946 Kercheval Ave., Detroit 15, Mich. It is not an attachment to a conventional outlet but rather it replaces the lower section of a conventional hopper and becomes an integral part of the bin.

Effect of the new design (diagram) as compared to the conventional type, is to greatly reduce, by re-alignment, the flow restricting pressures (pw) and permit the full force of the pressure (pd) to freely discharge the materials. Tests of Bituminous Coal Research, Inc., with 12x12-in Bin-Dicator Hyperbolic Outlets evidenced that minus ¼ in weathered coal, of very high clay content, could be discharged at rates between 300 and 500 tph even with 10% surface moisture. Said to eliminate bridging, rat-holing, erratic flow, vibrators, probing and hammering, the design is incorporated in a series of standard units in sizes adaptable to most standard bins and requires no maintenance.

Rubber-Lining Material

"Jade Green Armabond," a hardy industrial rubber-lining material that cold-bonds itself to a wide variety of surfaces, including metal, fabrics and other rubber compounds, with field-applied cement, has been developed by Goodyear Tire & Rubber Co., Akron 16, Ohio. Designed to protect interior surfaces of cyclone collectors, chutes, etc., it is also suitable for "recapping" conveyor belts. Only cleaning of the surface and spreading of cement is necessary before the rubber is placed. The chemical cure resulting from the action of the cement is said to give adhesion far in excess of common adhesive cements. Offered in gages from 1/16 to ½ in and in 48-in widths.



Pumps Provide Easy Parts Changing

Single-stage centrifugal pumps in 11 sizes with capacities to 775 gpm and heads to 300 ft, said to provide the optimum in interchangeability of pumps and parts, are offered by Goulds Pumps, Inc., Seneca Falls, N. Y. Specific advantages of the modern design include such features as: (1) maximum dimensional interchangeability between all pumps, (2) top centerline discharge is self-venting and simplifies piping; and (3) back-pull-out design enables easy replacement of parts most subject to wear or damage without disturbing pipe connections or motor mounting. The complete line is stocked in three standard constructions —ductile iron, 316 stainless steel and Gould-A-Loy 20. It is also available in any machinable alloy to meet special needs.

Rock Drill With Remote Controls

A crawler-mounted rock drill – the TDM-B1 – with remote controls and other labor-saving devices has been introduced by Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa. Flexible swinging boom design permits hydraulic positioning of the feed and drill to put down holes in a lateral arc 45 deg from center. This means the drill can be positioned over the side of the crawlers for line drilling in confined areas. Changing from vertical to horizontal drill without manual adjustment of the feed is

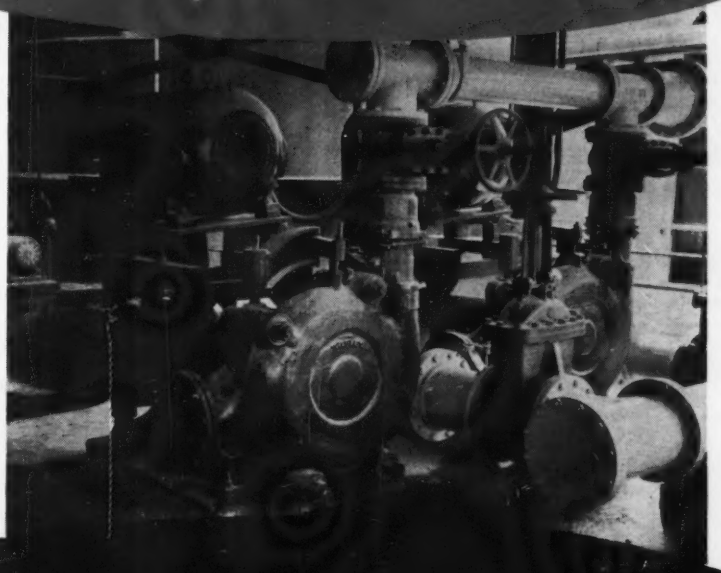
Dollar Saving Efficiency

THROUGH

LOW COST INSTALLATION

LOW COST OPERATION

LOW COST MAINTENANCE



WILFLEY SAND PUMPS

Low cost pumping—the built-in trademark of Wilfley Sand Pumps. Wilfley gives you low installation cost for the pump and prime mover. No auxiliary equipment necessary.

Long-wearing parts—few in number, are constructed of the best alloy metal or rubber-compound for your service. Wilfley's quick-change features allow speedy replacement of worn parts. Rugged, simple frame construction and packingless design guarantee trouble-free 24-hour service without attention.

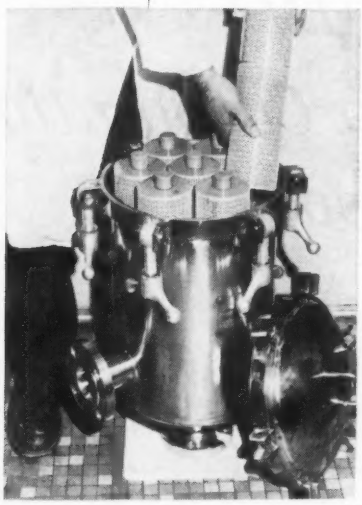
Wilfley Acid Pump
"COMPANIONS IN ECONOMICAL OPERATION"
Wilfley Sand Pump

For lower pumping costs, higher output, longer pump life—specify Wilfley Sand Pumps.

Individual Engineering on Every Application

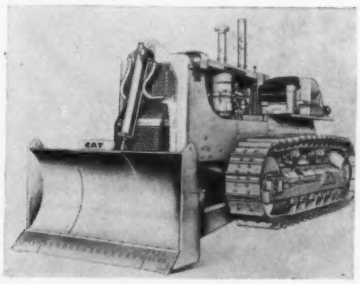
A. R. WILFLEY and SONS, INC. Denver, Colorado, U.S.A. P.O. Box 2330
New York Office: 122 E. 42nd St., New York City 17, N.Y.

accomplished through full-range power positioning. Another feature is an automatic hose reel which keeps the hoses which lead to the drill aligned and out of the way.



Hydraulic Fluid and Water Filter

Hydraulic and other petroleum-based fluids and water can be filtered to absolute 3-micron cleanliness by means of the "Triphane" filter assembly at rates up to 170 gpm continuous flow, without requiring recirculation or preliminary filtration. A development of Aircraft Porous Media, Sub. of Pall Corp., Glen Cove, N. Y., this product features extremely high dirt capacity. Heart of the unit consists of a combination fiberglass membrane primary throwaway cartridge. Housings are of stainless steel and rated at 125 psi. Full details from the company.



Pushloading Dozers

Incorporating a single-lift cylinder for hydraulic controls, the No. 8C and No. 9C cushion-action push dozers have been announced by Caterpillar Tractor Co., Peoria, Ill., for the Cat D8 Series H and the D9 Series E tractors. A case-mounted cushion push block for the D8H and improvements to the 176 hydraulic control for the D8H and the 184 hydraulic control for D9E were announced concurrently. Equally effective for smoothing the cut, haul road repairs and other normal dozing work, the Nos. 8C and 9C bulldozers permit push tractor approach and contact with scrapers at relative speeds to 3 mph. More complete cushioning was accomplished by lengthening the travel distance before "bottoming" of the four rubber springs. Cycle-time reduction and increased spread performance are available through use of the No. 8C cushion push bulldozer.

Small Pump, High Capacity

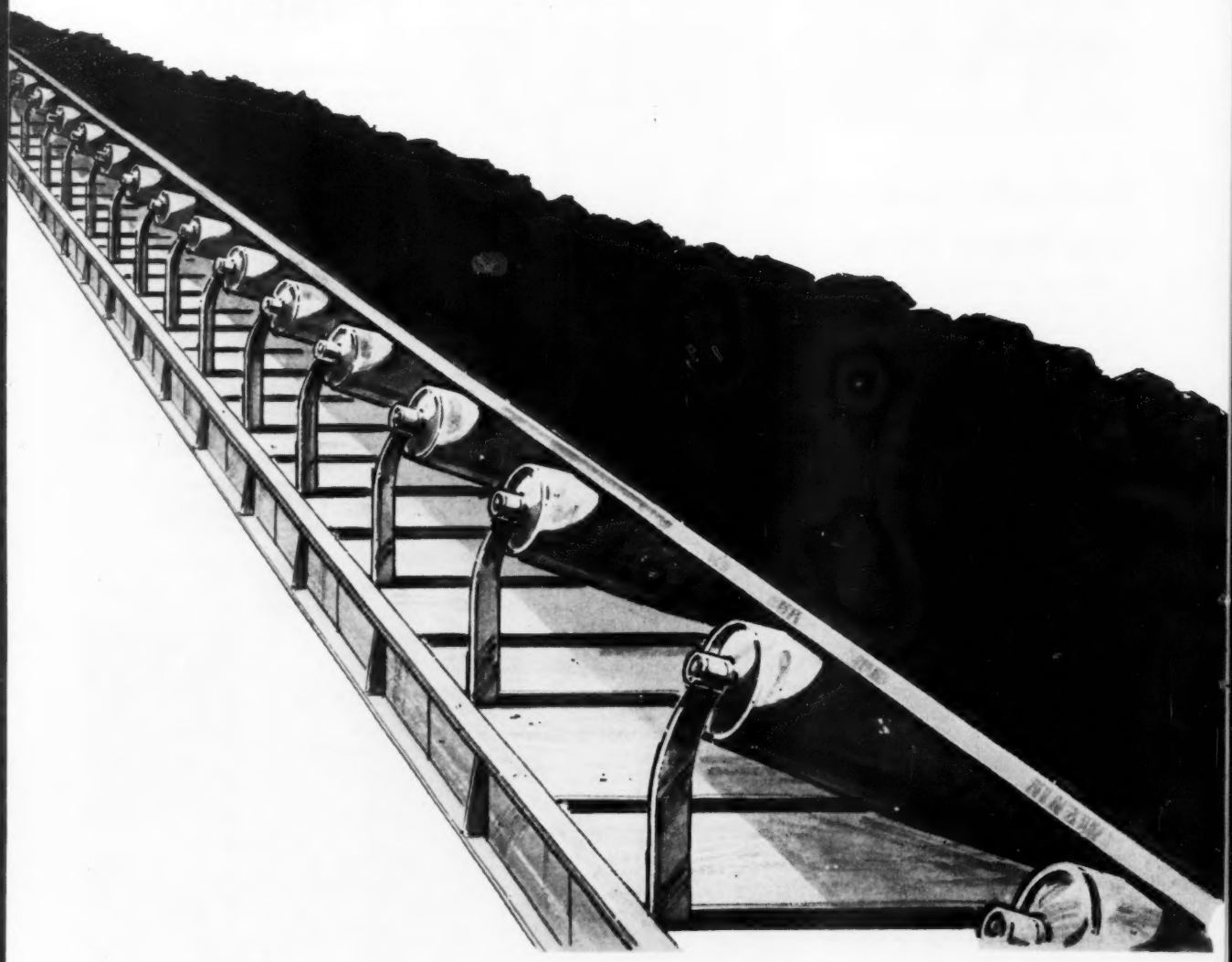
Christened the "Bibo 3-Inch," an electric submersible compact pump weighing only 88 lb, yet capable of capacities exceeding 20,000 gph and heads to 105 ft, has been developed by Flygt Corp., Hoosick Falls, N. Y. Major improvements include redesigned impeller for lower power consumption, fewer parts, less expensive, easier-to-adjust diffuser and larger, more accessible junction box. Efficiency of the pump is reported better than 60%. Available in 220/440- and 550-V, three-phase, and 220-V, single-phase.

Rugged Hose

A water suction hose designed especially to resist damage from truck movements is being marketed by Goodyear Tire & Rubber Co., Akron 16, Ohio. Identified as "Rebound" because it springs back to its original shape even if completely crushed, the hose is produced in lengths to 50 ft and in 1½-

FROM DRILLING TO CLEANING...

AMERICAN CYANAMID
helps the Glen Alden Corporation
produce world famous
BLUE COAL!



from drilling to cleaning, specify

in the mine...

American Cyanamid is one of Glen Alden's prime suppliers of explosives and blasting accessories. At Wanamie #19, for example, where all coal is blasted from the solid, American 12 A (½ x 8) Permissibles are used.

Ross and Red Ash veins are being worked and the explosives used permit working faces to be advanced rapidly and efficiently. Blasting pattern affords space for blasted material to be moved out with each firing round. Number of holes per cut average 10 or 12 with 5 to 7 sticks per hole. Coal is loaded mechanically and by hand for transfer to surface.

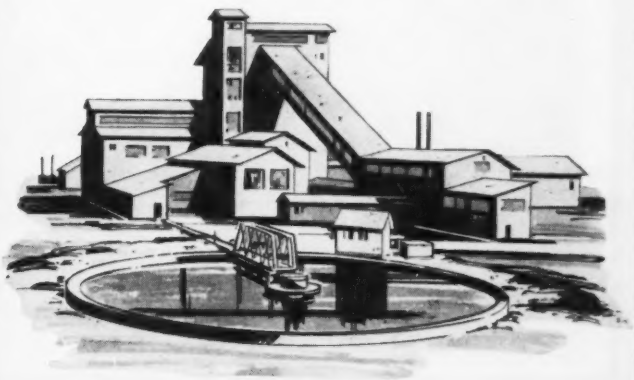
Cyanamid offers the coal industry 12 American permissibles with a variety of low, medium and fast rate powders in a wide range of densities. There's a correct grade for every requirement! To enable you to enjoy the benefits of multiple shooting, we supply COAL KING® Delay Electric Blasting Caps in 15 delay periods and a variety of leg wire lengths.

in the breaker...

Wash water effluent from washing anthracite flows to a 120 foot diameter thickener at the rate of 12,000 gallons per minute, carrying 50 tons of solids per hour for clarification. 15 pounds of AEROFLOC® 3171 Reagent per 7-hour shift is fed as a 1.0% solution to the wash water launder. Slimes are settled fast leaving clear thickener overflow.

Other Cyanamid chemicals for the coal industry include AEROFLOC® 550 and 3000 Reagents and SUPERFLOC 16® Flocculant to remove solids from effluents. AEROFROTH® 65, 73 and 77 Frothers to float fine coal particles away from refuse, AEROSOL® OT-75% to improve wetting power of sprays to allay dust, AERO® Depressants to reduce frothing and foaming of coal slurries and AEROSPRAY® 52 Binder to cut wind loss of exposed fines in storage or shipment.

Our experienced representatives will assist you in the best selection and use of our products. Prompt delivery is assured.



CYANAMID

AMERICAN CYANAMID COMPANY

EXPLOSIVES AND MINING CHEMICALS DEPARTMENT

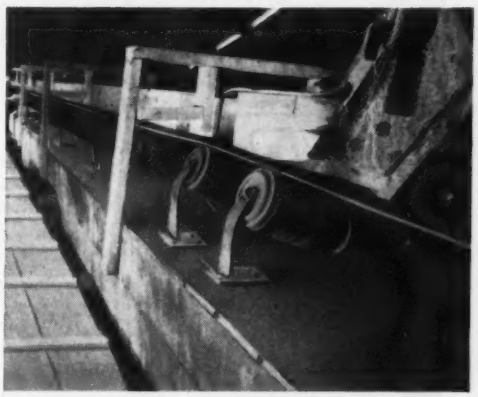
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Explosives • Blasting Caps and Accessories • Blasting Agents • AM-9 Chemical Grout • Mining Chemicals

AT THE HEART OF INDUSTRY... US RUBBER

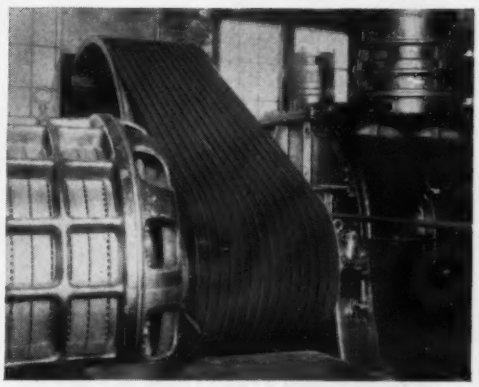
Serving the famed Moss #3 Mine of Clinchfield Coal, Duty, Va., 48"-wide U.S. Rubber MineHaul main haulage belts, each more than a half a mile long, carry 3,000 tons each per shift. These belts, in turn, are fed by a number of 36" panel belts. The fact that most of the belting used in this six-million-tons-a-year mine was made by US reflects U.S. Rubber's position as the world's leading authority on conveyor belting. CB 101

At the heart of the coal mining industry, you'll find US...with the industrial rubber products that provide "minimum mining maintenance." See how and why U.S. Rubber products serve you better, cost you less. See Booth 801 at the 1961 Coal Show in Cleveland.



Dramatically reducing maintenance and downtime for conveyor belt installations everywhere, patented U. S. Searle Sleeves protect rollers against impact damage, corrosion, build-up of wet muck, fines, and abrasive dusts. Belt wander is eliminated, edge wear greatly reduced, troughing substantially improved. Both belt and idler rollers wear far longer. SS 101

Long after other hose have failed from the cuts, abrasion, and abuse of heavy-duty work, U. S. Matchless® Air Hose can be seen powering equipment at mining and construction sites everywhere. Its unique ability to withstand the toughest treatment is but one reason why U. S. Rubber is the largest producer of hose in the world, with a complete line of hose for every industrial need. H 101



Cut costs, reduce maintenance, avoid shutdowns. In mines across the country, U. S. Royal V-Belts power fans, pumps, compressors, generators, conveyors—equipment that demands the maximum in reliability for safety as well as profit. U. S. Royal V-Belts are known throughout industry for their exceptional length stability, uniformity, and long service on drives of all kinds and sizes. VB 101

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Protective Linings... custom-designed rubber products of every description. Discover why U. S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U. S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

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US RUBBER

United States Rubber
MECHANICAL GOODS DIVISION

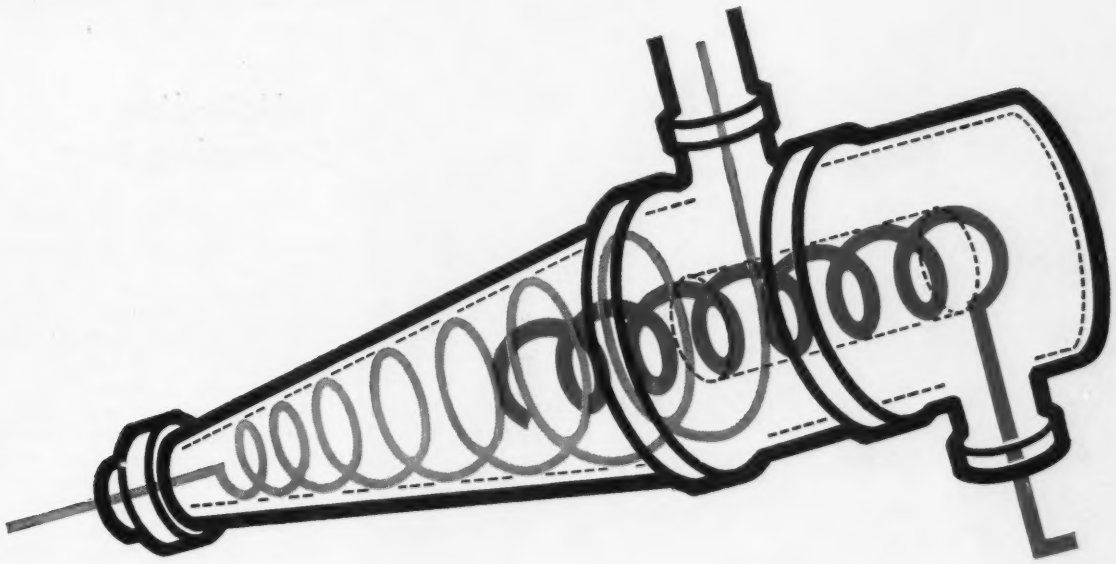
to 3-in inside diameters. Shape of the hose is maintained by a specialty-treated rope helix embedded in heavy rubber between two plies of fabric reinforce-

ment. The helix also prevents collapse of the hose at high vacuum. The interior tube is a nonporous rubber compound that resists action of sand and grit and also is impervious to mildly acid or alkaline water. While stocked with straight ends only, it can also be furnished with enlarged ends.

Portable AC Arc Welder

Designed for small-scale production and maintenance welding applications, Model M 18 T-1 is a portable, medium-duty AC arc welder added to the Murex line by Metal & Thermit Corp., General Offices, Rahway, N. J. The 180-amp, compact unit is mounted on heavy-duty wheels and can be moved easily. Full 80-V open circuit voltage allows welding with all types of electrodes from 1/16 to 3/16 in in diameter. An auto-

DUTCH STATE MINES
HEAVY MEDIUM *Cyclone* WASHER



1960 OPENED A NEW ERA
IN THE PRODUCTION AND MARKETING OF COAL

Installations of the Dutch State Mines Heavy Medium Cyclone Washing System in the United States during 1960 demonstrate new marketing and profit opportunities for the industry.

It is now possible, on a continuing production basis, to meet the critical requirements of public utility and industrial plants for premium quality, uniformly graded coal. *It is being done today in the American market!*

The Heavy Medium Cyclone Washing System cleans fine coal cleaner than by any other cleaning method.

You have positive control and laboratory efficiency on a production scale. You can obtain maximum recovery of present output. You can upgrade to premium quality seams of coal which otherwise are unfit for mining.

The efficiency of the Dutch State Mines Heavy Medium Cyclone Washing System has been proved in more than 40 successfully operating plants in 15 countries throughout the world. It is available in the United States exclusively through Roberts & Schaefer. Installations can be made in your present facilities as well as in a completely new plant.

A Roberts & Schaefer engineer will be glad to give you complete information.

Since 1903, Roberts & Schaefer has pioneered in the engineering of advanced plant design and facilities for the preparation of coal. Introduction of the Dutch State Mines Heavy Medium Cyclone Washer in the American market carries on the R&S tradition of leadership in the field. Roberts & Schaefer provides a complete service covering initial process studies, design and engineering, installation and construction.

ENGINEERS & CONTRACTORS

ROBERTS & SCHAEFER *Company*

DIVISION OF THOMPSON-STARRETT COMPANY, INC.

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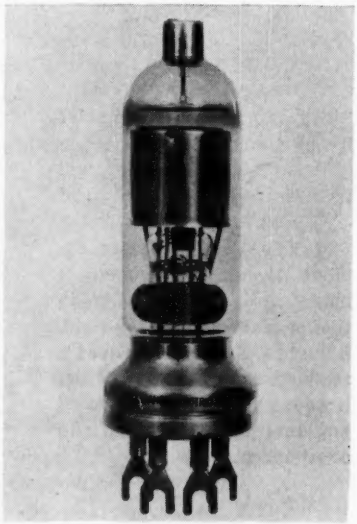
New Equipment *(Continued)*

matic balance volt-arc feature provides a deep penetrating arc at high ampere settings and a soft arc at low settings for light-gage metals. The 15- to 180-amp range is covered in 15 steps.

Self-Sealing Stemming Bags

Invention of the "Fabron" self-sealing stemming bag is reported to have overcome the problem of introducing water quickly, cheaply and efficiently in water stemming, an important and recognized development in blasting technique. It consists of a length of flexible, tough, flame-retardant plastic tubing, sealed at one end with a patented self-sealing valve at the other. A simple filling apparatus, designed to ensure an even flow of water, is the only requirement to produce a 15-in length of rigid, easy-to-handle water stemming and this action requires 10 sec to perform. A foot pedal controls the filling machine. Improved blasting efficiency afforded with use of Fabron bags permits shotholes to be drilled farther apart; alternatively, the weight of the charge may be reduced by about 20%. An appreciable reduction in the density of the visible dust cloud raised and of fumes from the explosive are advantages noted. Screening tests in coal mines indicate a 3 to 4% increase in coal exceeding 2 in in size. Offered by B.E.P. Industrial Equipment, 6346 W. McNichols, Detroit 21, Mich.



TUBES—New thyratron and diode tubes predict tube failure 300 hr ahead of time by changing color from normal blue to neon red, thus allowing ample time for replacement and thereby minimizing possibility of machine downtime. Tests

If you're looking for a bit at a bargain... DON'T!

Bit illustrated: CC-9

They cost you more than they save every time!

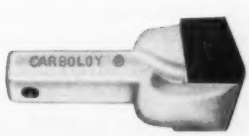
In mining, quality is the keyword. That's why it's so important to choose equipment and components that do the job you expect. In machine bits, that spells Carboloy®.

Carboloy machine bits for coal mining give you higher tonnage output, last longer. And you can depend on Carboloy bits to be of the highest uniform quality order after order. No guesswork here!

Get the output only Carboloy mining bits can give you. Check with your Authorized Carboloy Mining Tool Distributor, today. He carries complete stocks of all Carboloy machine bits. And there's a Carboloy engineer nearby to assist you. *Metallurgical Products Department of General Electric Company, 11120 E. 8 Mile Street, Detroit 32, Michigan.*

APT STYLE

2-Prong Roof Bit—Cuts straight, clean, on-gage holes fast in medium formations. Longer tool life.



PTV STYLE

Roof Bit—Solid insert. Tipped with wear-resistant carbide for maximum footage between regrinds.

CARBOLOY
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

MINE-POWER

by Steve Bunish

whose many years of practical experience underground followed by developmental work at Anaconda has made him a recognized authority on mining cables.

Steve Bunish answers your questions on mine cable application and maintenance.

#1: premature failure of trailing cables

Dear Steve,

We take all the routine precautions with our trailing cables—keep them off sharp edges, try to avoid overloading them—but the cable doesn't hold up as long as it should. Our only clue to these failures is little knots that show up in the jacket, but the cable doesn't fail until some time after these bumps appear. What are we doing wrong?

R.T.M., West Virginia

Dear R.T.M.

It sounds as if your cables are failing through excessive tension. Stretching a cable and then releasing it creates two different problems, both of which shorten cable service life.

When a cable is stretched, the conductors, insulation, and jacket are damaged. The stranded conductor is subjected to compression and shear forces, which weaken it. The insulation becomes very vulnerable to compression cutting, especially when the tight cable is run over and the insulation crushed against the stranded conductor. The jacket is also easier to tear and cut when the cable is stretched.

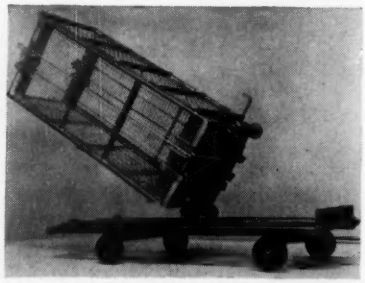
Release the tension on a stetched cable, and you set up different problems. The jacket and insulation are more elastic than the conductors, so they tend to go back to their original "pre-stretch" length. But once the conductor is stretched, it stays that way. Result: the jacket and insulation pull the conductor into kinks, which show up as bumps or knots in the jacket. These kinked spots won't necessarily break right away, but they're potential trouble spots that will fail pretty soon.

The only way to get around this problem is simply not to stretch the cable. Once the bumps appear, the damage is already done, and it's quite a price to pay for temporarily getting a few extra inches of reach out of a cable. 61254

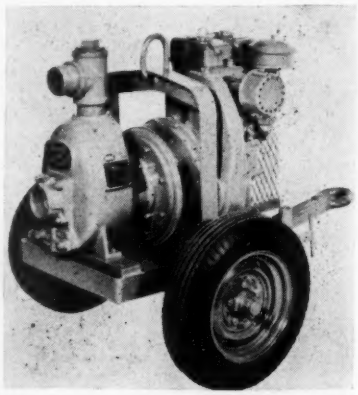
Steve Bunish will be glad to answer your minepower problem. Simply write it up and send it to "Minepower," c/o Steve Bunish, Anaconda Wire and Cable Company, 25 Broadway, New York 4, N. Y.

New Equipment *(Continued)*

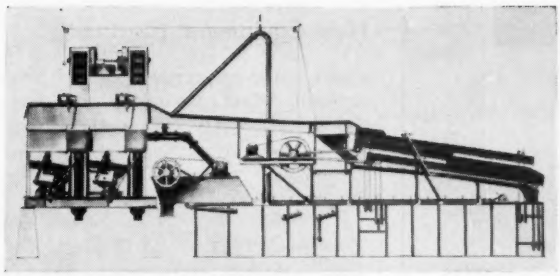
in service also indicate that tube life has been doubled as a result of new design and manufacturing techniques. Standard on Reliance V-S Drives, the Life Indicating Tubes can be used on many makes of drive or process employing thyratron or diode tubes. Available in 2.5- and 6.4-amp rating—pin or lug base, from Reliance Electric & Engrg. Co., 24701 Euclid Ave., Cleveland 17, Ohio.



CONVERTIBLE TIMBER CAR—An open-end timber car designed with separable trucks for track or trackless mining has been announced by Vulcan Iron Works Co., 2960 S. Fox St., Englewood (Denver), Colo. The car is loaded in the timber yard, trammed to the shaft collar and loaded as a cage with or without the trucks. For trackless mining, the unit is wagon-rigged with steerable front end and pneumatic tires. Cars can be supplied for any size shaft compartment having two guides.



CENTRIFUGAL PUMPS—A series of seven new air-cooled, diesel-powered, self-priming centrifugal pumps with capacities from approximately 15,000 to 90,000 gph are being produced by Rice Pump & Machine Co., Belgium, Wis. The line is available with 2-, 3-, 4- and 6-in openings. Diesel engines are 4-cycle, air-cooled, crank-start types with electric starters optional. Controlled weights throughout overall design permit use of high-speed trailers with 4.00x12 and 5.90x15 pneumatic-tired



Above—Unit Washer with two compartment Diaphragm Jig, dewatering and sizing screen, clarification tank with recovery conveyor and water circulating system. (Patented)

"Here's how Jeffrey helps us maintain our high uniformity"

Coal is effectively dewatered and accurately sized by the Jeffrey system, producing a product that is uniformly high in quality. Equipment furnished by Persinger Supply Company, Williamson, West Virginia, an authorized Jeffrey Distributor.

"Our Jeffrey-equipped plant produces 3,000 tons per day of the high quality coal demanded by our steam and metallurgical coal customers", says Mr. Fon M. Johnson, President of Johnson Mining Company, Pikeville, Kentucky.

Coal from a pair of silos is proportioned to the plant by two Jeffrey vibrating feeders. After screening and reduction in a Jeffrey crusher, it is washed, cleaned, sized and dewatered in the Jeffrey equipment.

The Jeffrey Jig rejects clean refuse, allowing only a small loss of burnable material. Ash content is held to an average of 3%. Quality and uniformity are maintained, day after day.

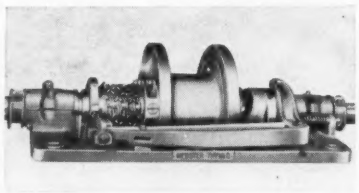
The Jeffrey Manufacturing Company, 912 North Fourth St., Columbus 16, Ohio.

If it's conveyed, processed or mined, it's a job for Jeffrey.

JEFFREY

New Equipment *(Continued)*

wheels and tow tongues. Skids and conventional wheel mountings are also offered.



AUTOMATIC POWER SHOVEL—The Webster No. 40 is an improved automatic power shovel for unloading bulk materials from railway cars or long truck trailers and can be used with wood, aluminum or steel scoops. Shovel mechanism (photo), offered in single and double types, is mounted on a rigid support 10 to 12 ft above car door level and is designed for maximum travel of 35 ft. Safety feature of mechanism is an exclusive reversing system, eliminating need for hazardous counterweights. Single-unit type weighs 575 lb; double-unit, 1,150 lb. Webster Mfg., Inc., Tiffin, Ohio.

Equipment Shorts

Rock Dust Batching Scale—A net weighing scale for rock dust batching, with a capacity of 40 tons of rock dust per hr at an accuracy of $\pm 1/10$ of 1%, has been developed by Thayer Scale Corp., Pembroke, Mass. The B18R unit consists of a special rotary feeder and a Thayer Flexure-Plate scale which supports a tipping weigh bucket. Abrasive dust, dirt, moisture, shock and temperature changes do not affect the scale, the company reports.

Wheel Dressing—A new concept in design of a diamond tool into a block-diamond wheel dresser is offered by Lazzara Co., 112 Meyerland Plaza, Houston 35, Tex. It incorporates 150 select quality Octahedrons set in tungsten powders and alternate layers of 21 and 22 diamonds in face for dressing wheel. Face measures $1/4 \times 5/8$ in and is $7/16$ in deep. This tool can be purchased in either a straight or 15-deg shank.

Switches—Small, lightweight "Deltadyne" switches actuate at differential pressures from 15 to 200 psi and withstand overpressure or internal pressure of 5,000 psi. Made by Pall Corp., 30 Sea Cliff Ave., Glen Cove, N. Y.

Reducers—Cleveland Worm & Gear Div., Eaton Mfg. Co., 3300 E. 80th St., Cleveland, Ohio, has added vertical units to its new line of fan-cooled worm gear

New Equipment *(Continued)*

speed reducers. Nine sizes, ranging from 3- to 12-in center distances are offered. Ratios extend from 4½:1 to 95:1; ratings are fractional to 175 hp.

Hydraulic Filters Converted—Schroeder Brothers Corp., McKees Rocks, Pa., has developed simple methods by which their line of conventional hydraulic filters may be converted to the use of new flame-resistant water-in-oil emulsions. Standard pleated-paper filters are replaced with fine-wire mesh which removes micronic particles from the fluid. To prevent pump starvation, the firm recommends use of Type SKB magnetic suction strainer—a 3/64-in opening strainer surrounding four strong magnets—to remove any foreign matter and magnetic particles.

Free Bulletins

Portable Lubrication Rigs – Servicing off-the-road equipment can be made easier through the use of portable lubrication rigs manufactured by the Cypher Co., 1201 Washington Blvd., Pittsburgh 6, Pa. Designed to fit the requirements of any size operation, these rigs are offered in various model sizes to fit all needs. Where climate or terrain dictates a special problem, the company's Engineering Dept. can design a rig to meet the situation. Descriptive catalog available.

Nuclear Gaging Systems—Bulletin 106 describes details, method of operation and specifications for nuclear gaging systems to be applied in measurement of liquid, solid, or slurry levels or interfaces. Offered by Ohmart Corp., 2236 Bogen St., Cincinnati 22, Ohio.

Portable Cables—Cable requirements, maintenance fundamentals and repair of damaged cable are reviewed in "Portable Cables for Surface Mining." Write to Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y., Dept. EFL-P.

Blasting Costs Worksheet—An easy-to-use worksheet, called the Austin Blast Report, permits accurate compilation of blasting costs. Request Form ABR from Austin Powder Co., Rockfeller Bldg., Cleveland 13, Ohio.

Holdback Clutches—Formsprag holdback clutches, specially designed to prevent runback or reverse travel of inclined conveyors, bucket elevators, capstans and related equipment, provide the theme of a 12-p catalog released by Formsprag Co., 23601 Hoover Rd., Warren, Mich.

Among the Manufacturers

Robert A. Gordon has been appointed assistant manager of district sales, Link-Belt Co., with headquarters in the executive offices in Chicago. He joined the company in 1946 in the engineering department of the Philadelphia plant and was subsequently transferred to the Pershing Road plant in Chicago in 1947 as sales engineer, specializing in drying equipment, oscillating conveyors and power plant equipment. Since June, 1958, Mr. Gordon has been on special assignment at the executive offices.

Gordon

William J. Loudermilk Jr. has been named sales representative in southern West Virginia, Long-Airdox Co. He entered coal mining in 1947 as transitman at Eastern Gas & Fuel Associates' Powellton No. 6 mine and later for Wharton No. 2 mine, Barrett, W. Va., where he became foreman in 1952. In 1957 he transferred to Eastern's Beards Fork, W. Va., mine as safety inspector, continuing in that capacity until April, 1960, when he joined Long-Airdox.

F. V. Schneider, formerly field sales manager, has been appointed to head a newly-created Processing Equipment Dept., WEMCO, a division of Western Machinery Co. In his new position, Mr. Schneider will be responsible for sales and development of WEMCO equipment in the mineral, coal, chemical, paper and food processing industries. WEMCO Div. is located in San Francisco, Calif.

Schneider

Three top executive positions have been announced by **Davey Compressor Co.: L. W. Darling,** formerly general sales manager, was named director of marketing; **C. E. Flora,** manager of industrial sales, replaces Mr. Darling as general sales manager; and **G. B. Edgell,** manager, engineering department, was made director of operations.

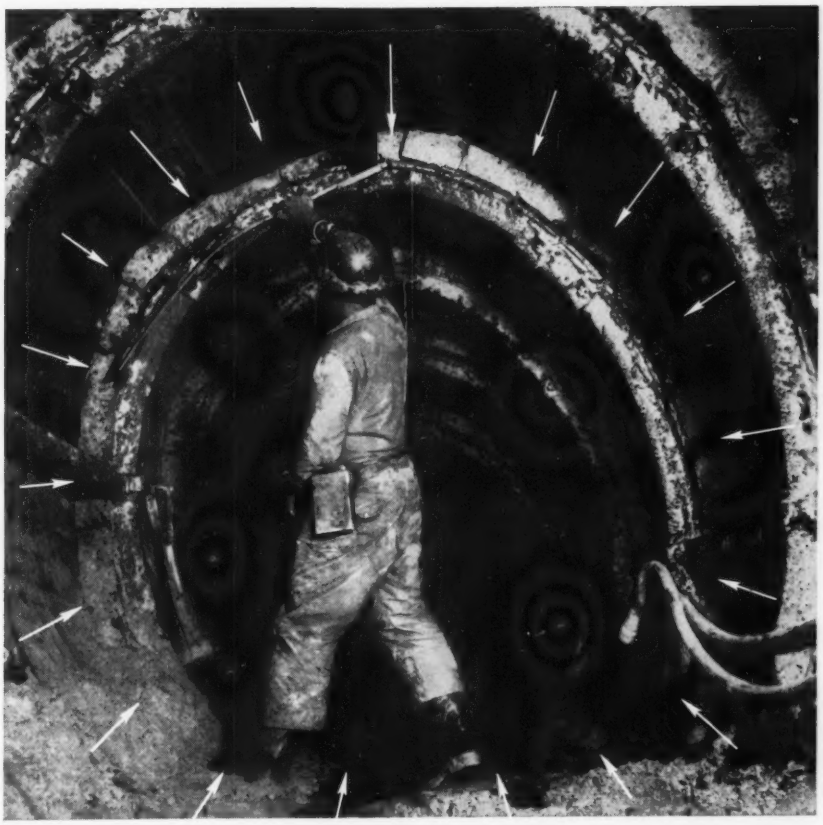
Clarence R. Ziegler, sales representative and technical field manager for the past 10 yr, has been made southern district manager, Austin Powder Co. A veteran of all phases of the explosives business, Mr. Ziegler will serve coal and other industries in Kentucky, West Virginia, Virginia, Tennessee, North Carolina, South Carolina, Georgia, Alabama and Flordia. He will headquarter in Knoxville, Tenn.

Ziegler

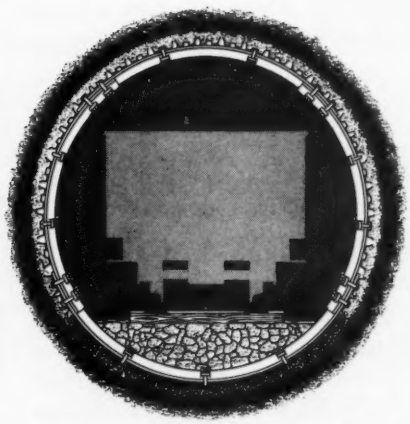
Sheldon Jones has been announced assistant manager, Huntington, W.Va. district, Goodman Mfg. Co. A graduate mining engineer of Pennsylvania State University, Mr. Jones has been associated with the mining industry for the past 21 yr in both mine operation and sales to mining companies. Most recently he served as district manager for Hulburt Oil & Grease Co. in their eastern division.

Jones

WHEN PRESSURES SQUEEZE FROM ALL DIRECTIONS



...install Bethlehem Yieldable Rings



Lagging should completely surround the Yieldable Ring set. Poles, planks, steel ties make good lagging.

If your mine opening has a heaving bottom, or is subject to squeezing pressures from all directions, the Bethlehem Yieldable Ring offers the best means of control. The Ring is a four-piece yieldable set with four joints instead of the usual two found on the Yieldable Arch.

Essentially, the Yieldable Ring is similar to the Yieldable Arch. It is made of the same nestable U-shaped sections, works on the same sliding-joint principle, and is available for the same range of mine openings—from 6 to 20 ft in diameter.

Installation of the Ring set differs from the Arch in that the two joints at the bottom of the ring should be tightened to about 150-ft-lb, instead of the 180-ft-lb torque normally applied. This is due to the fact that the bottom two joints usually will lie in muck, which adds measurably to the friction in the joint.

One more important point: with the Yieldable Ring, as with the Yieldable Arch, lagging and packing are necessary to fill the voids between steel and rock. Lagging should *completely surround* the Yieldable Ring, as shown in the sketch.

Bethlehem engineers will be glad to visit your workings to determine how the Yieldable Ring or Arch might improve your roof control. For action, just get in touch with the nearest Bethlehem office.

BE SURE TO VISIT US AT THE
COAL SHOW
CLEVELAND
MAY 15—18

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Du Pont reports on

a new type of conveyor belt carcass

that sets new standards of performance

Made with load-bearing components of DACRON® fiber, it resists deterioration better, carries more, cuts handling costs

Today, a new type of conveyor belting offers you cost-saving performance on the toughest jobs in industry. The reason is a fabric carcass made with strong reinforcements of "Dacron"* polyester fiber running the length of the belt.

Superior resistance to deterioration—"Dacron" is not affected by rot and mildew, so these belts do not have problems with moisture in cover cuts, or when fabric is exposed in the splice area. "Dacron" also withstands belt-fastener rust and most chemicals to assure long service under tough, wet or dry operating conditions.

Improved durability—Impact resistance is excellent. The high strength of "Dacron" teams up with the strength and elasticity of nylon, the cross fiber, to sustain shock loads. "Dacron" resists stretch. This means lower growth of the belt in service—fewer take-ups.

Better flexing and troughing—Because of this high-strength carcass made with "Dacron", these belts can be thinner, permitting the use of smaller-diameter pulleys. They are more flexible, train better on idler rolls—resulting in less belt wander and edge wear. These belts have a better resistance to flex failure—an important long-life feature.

Troughing up to 45° is possible, compared to the usual 20°. This means belts can be narrower and lighter—and still carry larger loads. The result is reduced handling costs right down the line!

More for your belt dollar—It all adds up to superior performance and the economy of long service with fewer belt replacements, less down-time, lower maintenance costs. Make sure you ask about conveyor belts made with "Dacron" polyester fiber next time you order—get the most for your belt dollar!

E. I. du Pont de Nemours & Co. (Inc.), Textile Fibers Dept., 191 South Main St., Akron 8, Ohio.

*Du Pont's registered trademark for its polyester fiber.

DU PONT
REG. U.S. PAT. OFF.
Better Things for Better Living
. . . through Chemistry

DACRON® *polyester*
the conveyor belt fiber

NEW!

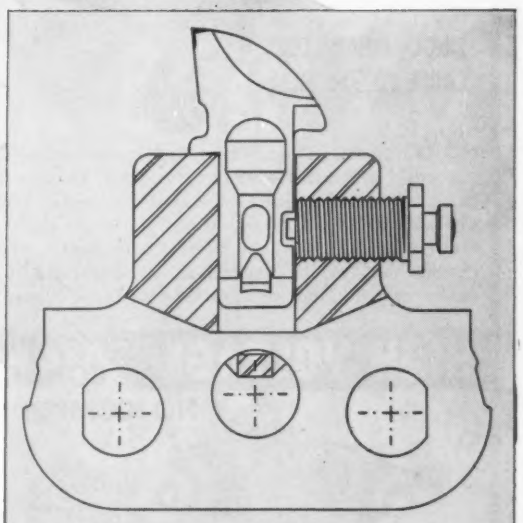
RSS QUICK CHANGE Cutter Bit slashes bit changing time 85%

For fast, easy bit changing, try the new Carmet® RSS Quick Change Cutter Bit with keepers in JOY V-type chains. Simply pry set screw plunger outward to retracted position (cutter bit is released instantly)—remove bit with free hand—replace bit—release plunger. Changing time is reduced 85%! Bit changes are just as fast in Bit Rings and Borer Blocks.

RSS Cutter Bits are designed for positive locking with JOY keepers. The threaded keeper plunger engages a forged notch in the tool shank, keeps the cutting tools locked firmly in place. No wobble, no battering of tool shank on keeper, no tools jerked out and lost.

And the RSS Cutter Bit is built to take abuse . . . with a beefed-up, load-bearing shoulder area that withstands higher cutting pressures . . . a plug-type carbide insert set at an angle that eliminates braze failure and insert loss . . . a full radius tip design that fully supports the insert, reduces breakage, permits harder grades of carbide.

The carbide, of course, is Carmet carbide . . . famous for quality. In fact, Carmet Division manufactures the complete mining tool, and their reputation depends on Carmet Tools being the finest available. There's a Carmet Bit designed for universal machines and continuous miners of every make, and your Carmet distributor carries a complete line in stock for prompt delivery. Call on him for help with your mining tool problem. ***Allegheny Ludlum Steel Corporation, Carmet Division, Ferndale, Detroit 20, Michigan.***



NEW BIT AND KEEPER COMBINATION
FOR JOY V-TYPE RIPPER CHAINS
FEATURING THE CARMET
RSS QUICK CHANGE CUTTER BIT

2377

NEW CARMET MINING TOOL CATALOG NOW AVAILABLE

For your copy, contact one of these Carmet distributors or write Carmet direct.

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Bluefield Hardware, Bluefield, W. Va.
Brace-Mueller-Huntley, Inc.
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Marion Mine & Mill Supply Co., Whitewall, Tenn.
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Mine Equipment & Supply Co., Madisonville, Ky.
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Peerless Supply Co., Des Moines, Iowa
Persinger Supply Co., Williamson, W. Va.
Persinger's, Charleston, W. Va.
W. B. Thompson Co., Iron Mountain, Mich.
Tri State Mine Supply Co., Uniontown, Pa.
Union Supply Co., Denver, Colo.
Vanguard Equipment Co., Chicago, Ill.
R. A. Young & Son, Inc., Fort Smith, Ark.

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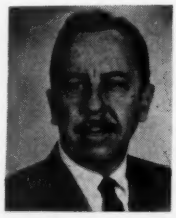
CARMET®

CEMENTED CARBIDE · DIVISION OF ALLEGHENY LUDLUM

NEW MANUFACTURING PLANT for W. S. Tyler Co. will be located on a 118-acre tract in the Mentor Industrial Park, 25 mi from Cleveland, Ohio. Construction contract in excess of $5 million has been awarded to George A. Fuller Co., New York. Providing more than 500,000 sq ft of manufacturing space, the new plant will produce heavy-gage wire cloth and vibrating screen machinery. Scheduled for completion in June, 1962, the plant will employ about 400 persons, all of whom now work at Tyler's Cleveland facilities. Present operations for the manufacture of heavy wire screen and screening machinery lines now carried on at the main plant will be moved to the new building. Other lines will continue to be made in Cleveland.

Bob Cannon has joined the Security Engineering Div. of Dresser Industries, Inc. as representative for Industrial Sales. His appointment will broaden Security sales and service to the mining and other industries in the Midwestern United States. Main offices for this new division will be in Milwaukee, Wis. Mr. Cannon was formerly employed by Bucyrus-Erie Co. and, previous to that, spent 17 yr in South America as a consulting engineer and contractor.



Cannon

Galis Electric & Machine Co., Morgantown, W. Va., has purchased the plants and equipment of **Fairmont Machinery Co.** from Consolidation Coal Co. Operations were suspended Feb. 28. Purchase also included Fairmont's subsidiary, **Lecco Mfg. & Engrg. Co.**, Bluefield, W. Va.

E. C. Chapman has been promoted from manager of the eastern division to assistant manager of the Sales Development Dept., Caterpillar Tractor Co. He joined the company in 1945 and has held a variety of supervisory assignments in sales and advertising. **W. E. McCoy**, manager of the southwest division, succeeds Mr. Chapman as manager of the eastern division. The company has also announced that the northwest and southwest sales divisions will be merged into the new western division, managed by **J. A. Justeson.**

Chapman

for action, economy and compact operation

the CMI model 26

CONTINUOUS CENTRIFUGAL DRYER

This compact CMI Dryer was designed and built to fit jobs of moderate proportion (up to 20 tph) . . . whether to dry coal or minerals to less than 5% surface moisture . . . to keep coal or minerals from freezing . . . or to recover coal or minerals from slurry ponds.

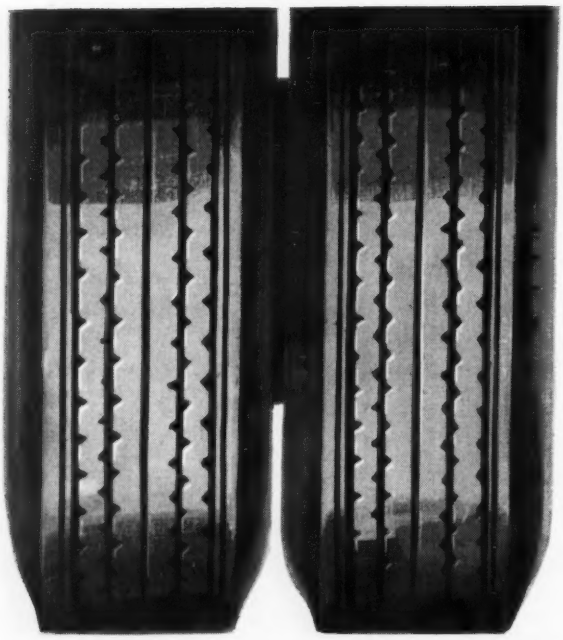
Model 26 is the ideal centrifuge where space or head room is limited, where production is less than 20 tph and where trouble and down-time free, economical and continuous operation are desired.

The CMI Model 26 is the smallest and most compact centrifugal dryer in the CMI line of dryers in operation in hundreds of installations in leading industries throughout the world.

BOOTH 313
COAL SHOW, CLEVELAND

CENTRIFUGAL AND MECHANICAL INDUSTRIES INCORPORATED — CMI

146 President Street • St. Louis 18, Missouri



UP PROFITS
BY ENDING
WEIGHT ERRORS!

FAIRBANKS-MORSE TYPE "S" TRUCK SCALES

Good weighing builds good will—and bigger profits.

Our exclusive Type "S" Truck Scales are famous for accuracy, low maintenance, best load distribution, and minimum installation requirements. They provide greater protection to pivots and bearings under massive loads and sudden stops.

Each Fairbanks-Morse Type "S" Truck Scale is extremely accurate. High-tensile-cast, one piece levers prevent warping, failure, corrosion due to damp scale pits. Exclusive Type "S" design provides super strength, better weight transmission, and protection for sharp knife edges. All parts, including pivots and bearings, are completely interchangeable.

Each Fairbanks-Morse Type "S" Truck Scale is expandable —for longer trucks and larger payloads.

You have a choice of indicators, either Beam type—or our exclusive, swiveling "Floaxial" Dial for fully automatic read-outs!

F-M Type "S" Truck Scales range in capacities from 10 to 100 tons and higher. Platform sizes from 18′ x 9′ up to any size required for the weighing of vehicles according to legal limits. Optional accessories include: double face dial; Printomatic for accurate, trouble-free weight recording; and type-registering weighbeam, etc.

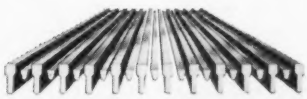
For further information, write: **C. G. Gehringer; Scale Division; Fairbanks, Morse & Co.; 19-01 Route 208; Fair Lawn, New Jersey.**

FAIRBANKS MORSE

A MAJOR INDUSTRIAL COMPONENT OF

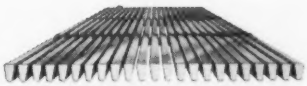
FAIRBANKS WHITNEY

T-WEDGE KLEENSLOT



A new concept in guard bar design. T-shaped wire replaces typical "bar" to increase screening surface while keeping large unscreenable lumps of material above the tolerance governing lower screening surface.

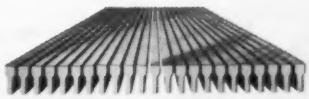
F217 and F250 KLEENSLOT



Manufactured with large size wedge shaped wires to maintain maximum efficiency over an extended period in abrasive applications.

Although large in wire size, this screen will easily maintain openings as close as 1 m.m.

G187 and GB187 MIGH-TEE KLEENSLOT

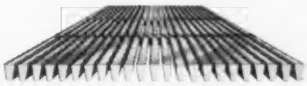


Special profile increases wearing surface. This is a heavy duty precision type screen that will easily maintain openings smaller than ⅛ m.m. and openings larger than ordinarily considered economical.

"S" KLEENSLOT

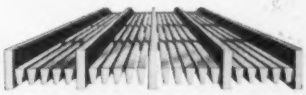
Engineered for applications where screening out of flats or slivers is of prime consideration. Can be also furnished in a "C" bend. Recommended for applications requiring openings larger than 1 m.m. For smaller openings, see Marcel screen.

MARCEL

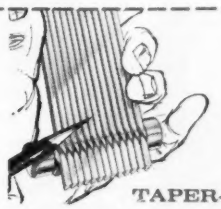


This screen, while screening out "slivers," presents a flat surface for materials to wipe the opening clean. Available with openings up to 1 m.m.—for larger openings see "S" screens.

SCREEN GUARD

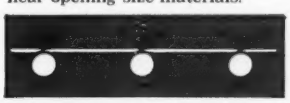


Vertical guard bars keep larger unscreenable materials above the actual screening surface. This increases screen life and promotes much greater efficiency in dewatering.



TAPER-SLOT

From loop to loop, the screen opening gradually increases. This design is to eliminate blinding when screening large amounts of near-opening size materials.



For example: .016 opening tapered to .024—the combination of opening sizes would be the same between each loop throughout the entire screen.

SEE US AT THE SHOW
BOOTH 925

WEDGE-WIRE CORPORATION
Wellington, Ohio

send for our free catalog

WEDGE-WIRE

REG. U. S. PAT. OFF.

Kleenslot

PREPARATION SCREENS

designed for vibrators or stationary applications for dewatering, screening, washing, extracting, filtering or sizing applications.

Wedge-Wire Kleenslot Screens are custom manufactured to your application and are available in many sizes, metals and finishes. Our engineering staff will assist you capably and promptly in obtaining the proper screen for highest production at lowest cost.

mining-oil-abrasives-foods-chemicals-cements-phosphates
SCREENS FOR INDUSTRY

Robert W. Hanna Jr. has been appointed manager of Link Belt Co.'s Pittsburgh district office and warehouse, succeeding Otto W. Werner who will devote his entire time to engineering contract sales. Mr. Hanna joined Link-Belt in 1941 at its foundry in Philadelphia. He served in the Philadelphia district office and warehouse prior to his transfer to Pittsburgh, where he had been district engineer since 1948.

Hanna

John S. Ray Jr. has been appointed sales representative, Duff-Norton Co., Pittsburgh, Pa. He will be responsible for sales of jacks and hoists in southern Illinois, Missouri and Kansas. Mr. Ray comes to Duff-Norton with more than 12 yr sales experience with the Central Foundry Div. of General Motors Corp., Eli Lilly & Co. and J. C. Penney Co.

Obituaries

A. F. Howe, 88, president, Centrifugal & Mechanical Industries, Inc., St. Louis, Mo., passed away Feb. 7 after a month's illness. A pioneer in the application of centrifugal force for removal of solids from slurry, his C-M-I centrifuges were among the first to be applied in the coal industry and have found world-wide application. Mr. Howe is an internationally-known authority on foundry practices with a number of patents to his credit in this field.

Howe

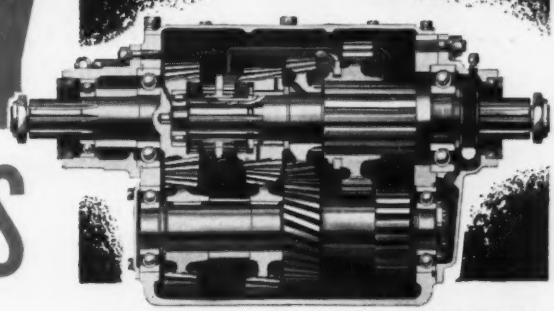
Emil Deister Sr., founder and president of the Deister Machine Co., died at his home in Fort Wayne, Ind. March 1. Born in Germany 88 yr ago, he came to Fort Wayne at the age of 11. Mr. Deister founded the Deister Machine Co. in 1912 and was active in company affairs until a few weeks before his death. His accomplishments include a large number of patent grants covering improvement in separating equipment, especially coal washing machinery and ore concentrating tables.

Deister

NEW 4-SPEED AUXILIARY TRANSMISSIONS

For Medium-Heavy-Duty Trucks and Tractors

MODELS 4-B-73 AND 4-B-75



SPLIT GEARS AND *GO*...SHIFT INTO DEEP REDUCTIONS AND *PULL*

You no longer have to pay a premium price for a 4-speed auxiliary which is heavier than your operation demands. Save weight *and* money with one of the new Fuller 4-speed Auxiliaries equipped with overdrive, direct, low and low-low gear ratios in one compact, 375-pound unit. Get gear-splitting ratios plus deep reduction.

The Fuller 4-B-73 is designed for use with engines producing approximately 500-600 lb./ft. of torque. Use of special high-capacity bearings permits the 4-B-75 to be used with engines in the 600-700 lb./ft. torque class.

Get all the extras of price, performance and payload. Specify the new Fuller 4-B-73 or 4-B-75 4-speed Auxiliary Transmissions. For full details, see your truck dealer or write Fuller Manufacturing Company.

GEAR RATIOS
Models 4-B-73 and 4-B-75

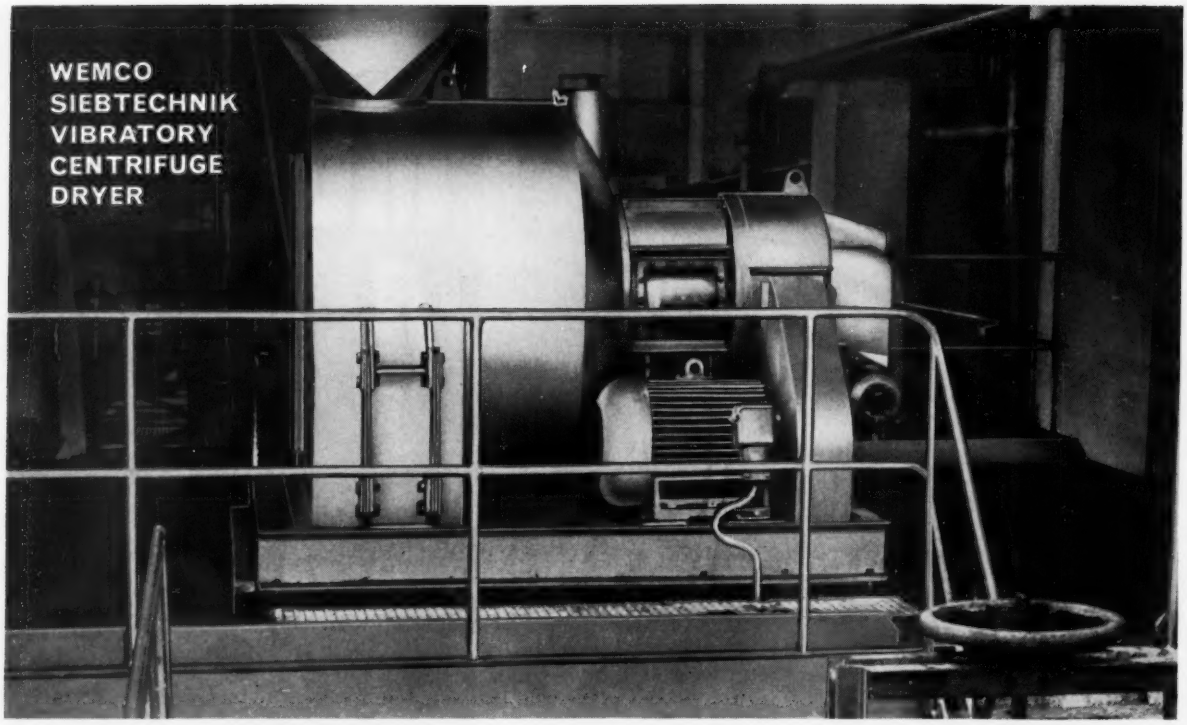
Overdrive	.85
Direct	1.00
Low	1.24
Low-Low	2.22

FULLER TRANSMISSION DIVISION

EATON MANUFACTURING COMPANY

KALAMAZOO, MICHIGAN

Sales & Service: West. Dist. Branch, Oakland 6, Cal. • Southwest Dist. Office, Tulsa 3, Okla. • Automotive Products Co., Ltd., Brock House, Langham St., London W.1, England, European Rep.



ON THE JOB REPORT: "machine running smooth as a clock...

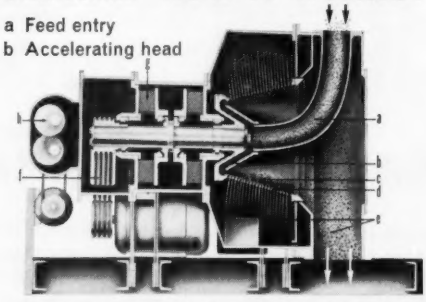
. . . De-watering over 120 TPH 1¼ x ¼" coal at 7 to 8% moisture; product less than 3% moisture."

Extracting over 4 tons of water per hour, the WEMCO Centrifuge already has paid for itself through savings in freight and premium on price of product. In this and other applications on minus 1½" coal, it offers economical dewatering. Vibratory action conveys coal through the dewatering basket without scrapers or spirals; product degradation and basket wear are negligible.

Horizontal design permits installation in low head room areas . . . easy access to main working elements. Years of successful operation in European coal fields and operating results in the United States prove the value of these and many other features of the WEMCO Siebtechnik Vibratory Centrifugal Dryer.

The unique operation of the Wemco Siebtechnik—**HOW IT WORKS:**

a Feed entry
b Accelerating head



c Maximum dewatering by vibrating motion
d Easily accessible and replaceable basket
e Solids and liquids discharged separately
f V-belt drive
g Main mechanism and bearing housing
h Vibrating action generated by adjustable eccentrics

Consult a Wemco representative for the record and potential of this new dewatering device. Or write for Bulletin D1-B1.

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650 Fifth Street, San Francisco 7, California

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Company Briefs

National Mine Service Co. is moving its Greensburg Div. manufacturing facilities from Greensburg, Pa., to the firm's Ashland, Ky. plant. The consolidated divisions will be under direction of **R. R. Schubert,** vice president, who is also in charge of the companys' Clarkson Div., Nashville, Ill.

Caterpillar Tractor Co., Peoria, Ill., has been awarded the 1960 George Washington Honor Medal by the Freedoms Foundation at Valley Forge in recognition of its "National Goals" advertising program to stir public awareness of the country's growth needs in various fields. Future requirements for coal and increased electrical power were discussed in the March ad appearing in the *Saturday Evening Post* designed primarily to develop public interest and support for steps that must be taken to meet the expanding power needs of the nation.

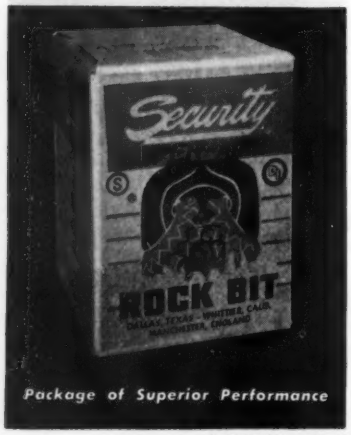
Midwest Steel Corp. has purchased the trackwork division of H. K. Porter Co., Inc., Huntington, W. Va. Included in the purchase was all machinery and inventory used in the manufacture of "West Virginia" brand railway trackwork and related items. The Huntington manufacturing facilities will be moved to a plant in Pomeroy, Ohio but company officers will remain in Charleston, W. Va.

Okonite Co., Sub. of Kennecott Copper Corp., has established two new branch offices—one in Denver, Colo., and the other in Charleston, W. Va. **James F. Angle,** Rocky Mountain district manager, will be in charge of the Denver office at 2829 E. 2nd Ave. **John P. Oblinger** will now locate at 1799 Huber Rd., Charleston 4.

Flood City Brass & Electric Co., Johnstown, Pa., has acquired the manufacturing rights for Austin-Brownie pumps from Sanford-Day Iron Works, Knoxville, Tenn. The new manufacturer plans to continue the Austin line of four sizes, suitable for capacities up to 100 gpm and for heads up to 250 ft.

Joy Mfg. Co.'s Electrical Products Div. has been named exclusive distributor for Okonite vulcanizer tapes. Okonite Co. will be Joy's sole source of supply for vulcanizer tapes. Certain of Okonite's accounts are excepted.

Eastern Malleable Iron Co., Naugatuck, Conn., whose Pattin Manufacturing division, Marietta, Ohio, is a major supplier of mine roof bolts to the mining industry, recently announced a legal change of the company name to **The Eastern Co.**



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SUPER-AIRE

BLAST HOLE BITS

for your drilling requirements

S SERIES — For Soft Formations* Designed to effectively drill the complete range of softer formations . . . shales, soft sandstone, soft limestone. Maximum offset of cones for greatest twisting — tearing action and long teeth assure fastest penetration rates. Self-cleaning action of cutter designs and placement of air courses prevent balling up and permit rapid removal of loose particles from bottom of hole.

M SERIES — For Medium Formations* General purpose bits for fast drilling of medium hard limestone, shaley limestone and other medium formations. Moderate offset is employed to increase penetration rates. Additional gage protection is provided by "T" tooth designs where formations are abrasive. Special cutter features, combined with sturdy tooth design, of these versatile bits, offer greater strength to withstand heavier drilling weights in harder formations.

H SERIES — For Hard Formations* Especially designed for use in harder formations, such as dolomite, hard limestone, traprock. Sturdy teeth, closely spaced on extremely strong cones, are capable of withstanding heaviest drilling weights. Gage tooth configurations are available with "L", "T" and full webb sections for hardest and most abrasive formations that can be cut with steel toothed bits. True rolling, non-offset cutters and extra large bearings assure longest life.

VARIABLE SIZE JETS AND AIR COURSES — To obtain optimum drilling performance, "Super-Aire" bits have field replaceable jet air nozzles or variable size air courses. Maximum cooling effect and optimum bottom hole cleaning can be obtained by selecting the proper size openings to suit the volume and pressure of the air available on the job.

UNRESTRICTED AIR PASSAGES—"Super-Aire" bits have unrestricted air passages to the bearings — an exclusive Security feature. The size of the passage is not limited by the ball retaining plug as in other bits. This permits proper air metering to critical areas, thus achieving maximum air expansion for most effective cooling.

SELF-CLEANING SCREENS—Security's exclusive extra-large capacity, full-length, self-cleaning screens minimize the possibility of plugged air passages which could result in rapid destruction of the bearings. Self-cleaning screens combined with unrestricted air passages assure superior performance of Security "Super-Aire" blast hole bits under the most severe operating conditions.

SHIRT TAIL HARDFACING — Shirt tail hardfacing is furnished on all "Super-Aire" bits in sizes 7⅜" and larger.

**Jet air or regular air types available. Send for Catalog.*

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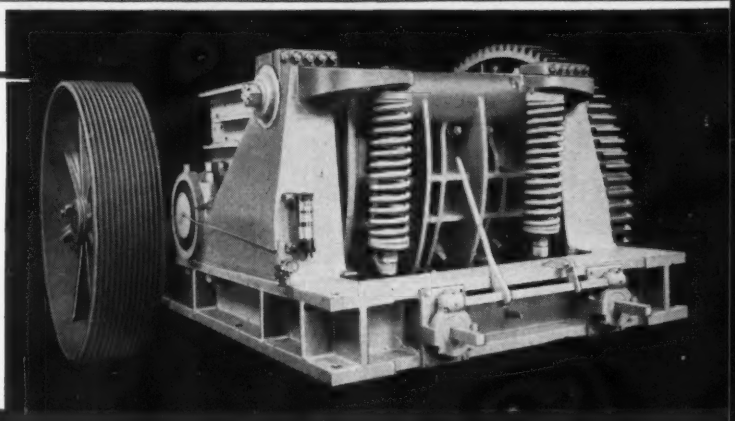
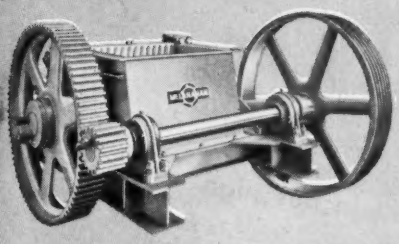
ROCKMASTER

World's Most Powerful Single Roll Crusher

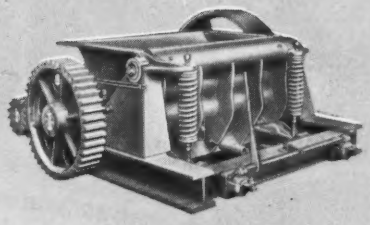
Widely used for crushing rock, slate and other mine refuse, Rockmasters have great strength for economy and extremely long service in the coal industry's most severe crushing applications. Steelstrut Toggle automatically releases tramp iron, while Quick-Adjustment controls size ranges.





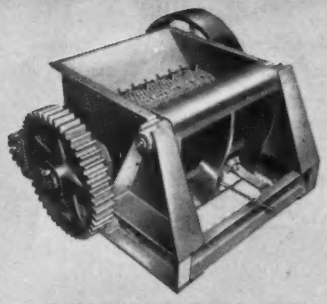
SUPER BLACK DIAMOND

Providing most Rockmaster features at moderate cost; single roll unit suitable for slate, shale, slag, mine refuse—effective in all but the most severe hard-rock operating conditions.



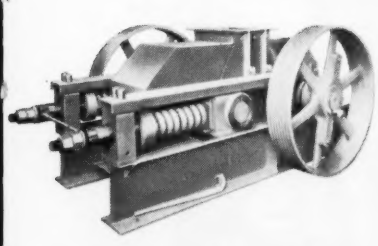
BLACK DIAMOND

A strong, durable, all-steel single roll construction—intended for reducing fairly clean coal or that containing a moderate amount of friable refuse.



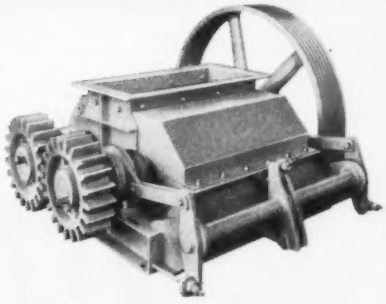
BANTAM BUSTER

Portable, economy single roll, with a high ratio of reduction; designed for trouble-free maintenance, built for crushing clean coal.



HEAVY-DUTY DOUBLE ROLL

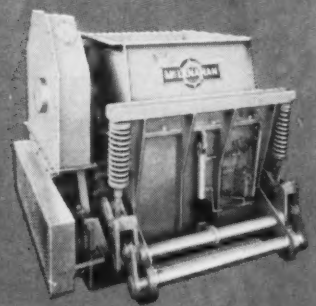
Extremely powerful, rigidly constructed—a companion to Rockmaster or Super Black Diamond on the most severe secondary reductions applications.



BLACK DIAMOND DOUBLE ROLL

Designed as a companion for crushers in the Black Diamond and Bantam Buster Class—a very economical unit for secondary reduction of fairly clean coal.

TWO-STAGE TRIPLE ROLL



Two crushers in one—a single-drive unit which reduces run-of-mine coal to fine sizes, always with a minimum of fines.

McLanahan and Stone Corporation

HOLLIDAYSBURG, PENNSYLVANIA

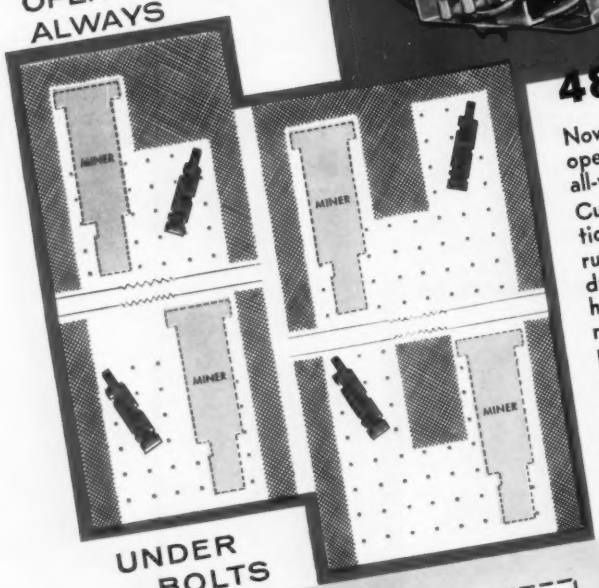
Pit, Mine and Quarry Equipment Headquarters Since 1835

Get Full Details at the Coal Show Booth #1712

a new **NARROW, LOW Galis**

the Roofmaster 310

Rotary Percussion ROOF DRILL Makes Continuous Mining Continuous . . .



48 inches wide—26 inches high

Now you bolt as you mine—specially designed to parallel operation of your miner—keeping operator under bolts, all-ways.

Cut minutes from positioning time—add hours to production time—maneuver crawler style with 4-wheel drive—rugged combination machine—straight rotary for soft drilling—flick of a valve converts to rotary percussion—hydraulic drives control percussion force to suit type of rock being drilled.

Bureau of Mines approved dust collecting system, draws dust by vacuum through the hollow drill steel, thence to collection box. All controls and operator's seat are conveniently within reach.

Clip and mail the coupon. Write now, right now.

Please send complete specifications — GALIS ROOFMASTER 310

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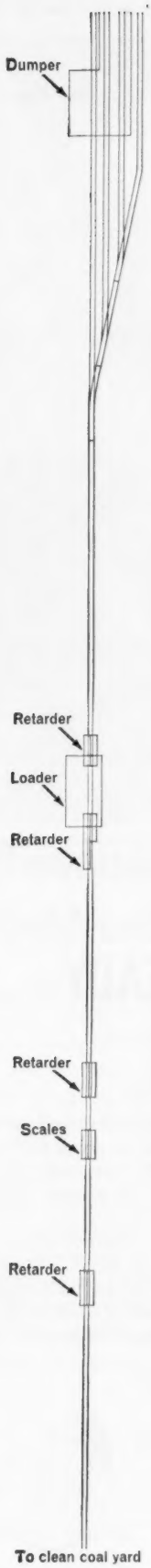


720 tons of coal per hour loaded safely with Union Switch & Signal Car Retarder System

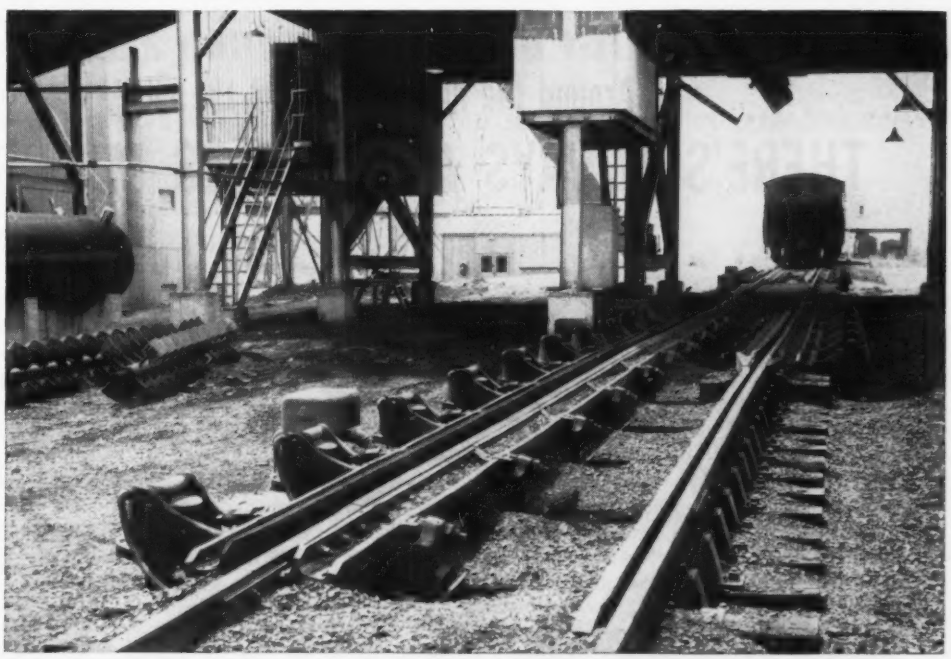
At U. S. Steel's coal cleaning plant, Corbin, Kentucky, a system of four car retarders is used to direct coal cars through loading, weighing and coupling operations. This Union Switch & Signal Car Retarder System places cars with speed and accuracy, eliminates a safety hazard and results in a substantial operating saving.

Empty cars are moved to the loading track where the pushbutton-controlled retarders take over while the cars are loaded. Cars next run by gravity to the retarders at the scale house, are weighed and then run by gravity to a collecting point at another retarder. The entire job is handled quickly and economically by two operators. In three years of operation, the system has been trouble-free and maintenance-free.

Let us help solve your car control problems. We will be happy to discuss with you—without obligation on your part—how a Union Switch & Signal Car Retarder System can speed up operations, promote efficiency, reduce safety hazards. Write today for more complete information.

The first retarder receives and controls empty cars before the loading. Under the loader the cars are slowed down by the second retarder, then move gradually to receive an even load distribution. The third retarder slows the loaded cars for accurate weighing. Just before the coupling, the cars are brought to a complete stop by the fourth retarder.

Empty cars moving to loader are controlled by first retarder, in background. This retarder arrangement provides for availability of 8 empty cars in advance of loading point. As loading progresses, second retarder, in foreground, controls movement of cars being loaded. This system of car handling moves cars with accuracy, assures a full, evenly distributed load.



UNION SWITCH & SIGNAL

DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY

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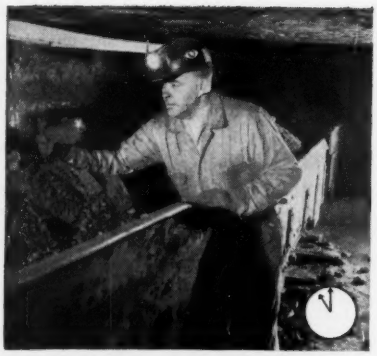
A Typical Day with a Hercules Representative

AN EARLY START enables Bob Shiel, Hercules technical serviceman, to observe step-by-step blasting procedures at his customer's mine.

CLOSE CONTACT between Bob and the mine superintendent eliminates most blasting troubles, and increases the operating economy of the mine.



UNDERGROUND with the tools of the trade, Bob examines some of the cars of blasted material to determine the effectiveness of the explosive charges.

BLASTING-PROCEDURE observation is a part of Bob's work. It takes the guesswork out of his job, and enables him to specify the proper explosives.

SHOP TALK helps find out if the remedy he's suggested has cured this mine's troubles. Bob's background gives him the insight necessary to make intelligent recommendations.

CHECKING and rechecking all the recommendations he has made gives Bob the satisfaction of knowing that he has been of assistance in solving his customer's blasting troubles.

Around the nation—around the clock

THERE'S ALWAYS A HERCULES MAN READY TO HELP YOU

Bob Shiel, E.M., Ohio State, is just one of the many specially trained Hercules men serving the explosives-consuming industries. For years Hercules has employed men with engineering training to sell and service its explosives throughout the United States and in many foreign lands. Our experience has proved that men with engineering training can meet their customers on common ground. They speak the same language, for most of the men who direct explosives-consuming work are technically trained.

When a young engineer starts his training as an explosives sales engineer with Hercules, he begins a period of orientation. He is then sent to our explosives plants and laboratories for thorough groundwork in products and processes. Upon completion of this indoctrination, he visits various sections of the country where he learns how explosives are used in underground and open-pit mines, rock quarries, heavy-construction jobs, and seismic exploration.

The cornerstone of Hercules Explosives Department is based on men who have the know-how to handle blasting problems quickly, efficiently, economically. To take advantage of this specialized service, call or write.

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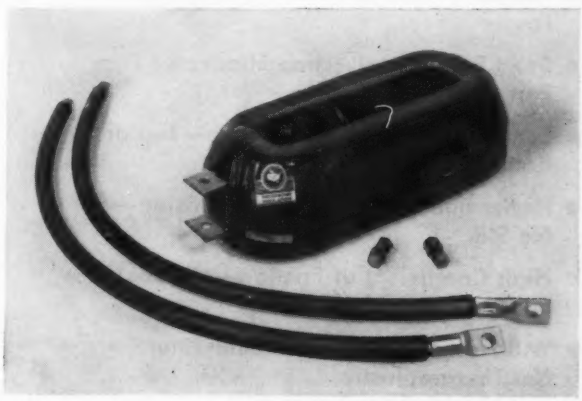
Rewound motors can be upgraded with NECCOBOND field coils by National ... *The Specialists in electric coils/repair service*

Rewinding time is an ideal opportunity to improve performance over that of the original machine . . . with the much more effective insulations available today.

For example, National manufactures field coils to your requirements with the NECCOBOND insulation system. The best insulating materials—mica and glass—are used. Then a high strength, inert epoxy resin is used to impregnate the whole coil. All voids are filled. The insulation wall is extremely tough, solid and durable.

NECCOBOND field coils upgrade performance. Coils operate cooler—insulation lasts longer and is impervious to water, oil, or other sources of trouble.

For more information call our Columbus plant—HUdson 8-1151, or the nearest National field engineer.



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Electrical Engineers • Manufacturers of Electrical Coils, Insulation, Lifting Magnets
Redesigning and Repairing of Rotating Electrical Machines

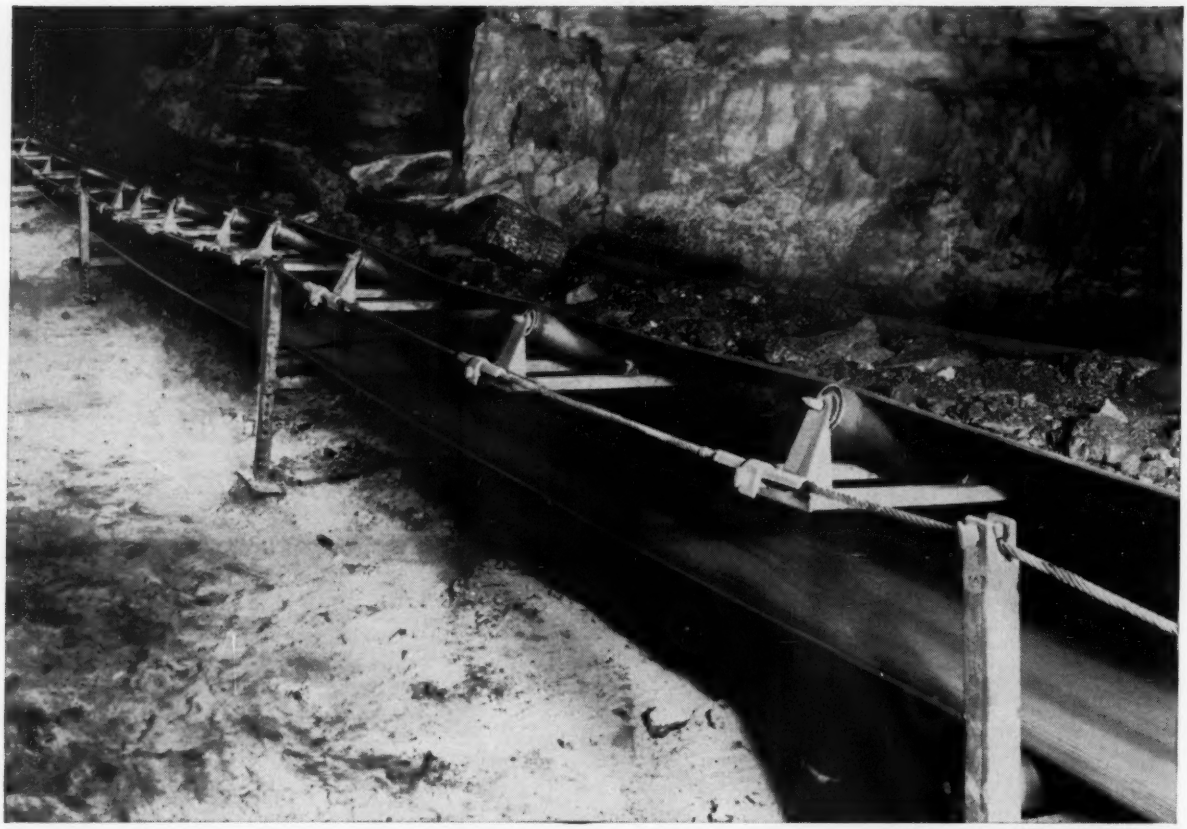

Photo courtesy of The Jeffrey Mfg. Co.

COMPARE R/M "COALMOVER"

With Any Other Conveyor Belt on the Market

- **Light Weight for Easy Handling & Re-spooling**
- **Holds *All* Underground Types of Fasteners *Longer***
- **Solid Edge Construction Eliminates Fray & Fan Out**
- **Engineered to Haul *Either* Side—Top or Bottom**
- ***Higher* Pulley Grip at *Lower* Tension—No Slip**
- **High Coefficient of Friction—No Coal Slippage as with Plastic**
- **Will Not Stiffen at Low Temperature—*Not* Thermoplastic**

In addition, this *entirely new* conveyor belt designed and engineered for the coal industry gives you *exclusive* R/M flexibility over reverse bend and snub pulleys.

It trains naturally, troughs easily to haul full loads in low headroom—with maximum resistance to rips, gouging, abrasion and impact! "Coalmover" requires minimum take-up adjustment—and like all R/M underground conveyor belts it's fire resistant throughout. *Designated "Fire Resistant, U.S.B.M. No. 28-10."*

Let an R/M distributor show you how to meet the new standard for performance with "Coalmover" Conveyor Belt.

"COALMOVER" HAULS MORE...LASTS LONGER...COSTS LESS

RM103

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MANHATTAN RUBBER DIVISION • PASSAIC, N. J.
ENGINEERED RUBBER PRODUCTS

AKINS

the ORIGINAL spiral classifier

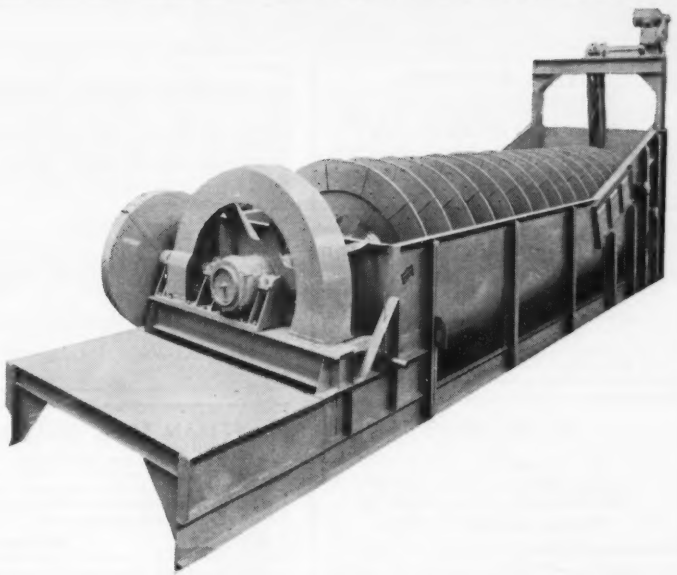
proved performance since 1908...

...on closed-circuit grinding, washing, desliming, dewatering, and size separation.

EXPERIENCE

is the key to the outstanding performance of Akins Classifiers. During the past 52 years we have originated and field tested many ideas for improving both the mechanical and metallurgical performance of the Akins Classifier. From this experience, those ideas which have been field-proven to be advantageous are incorporated in the present Akins... the most effective spiral pitch, a trouble-free submerged bearing, best type of tank support, and adaptations, such as side weir, spray water box, serrated wearing shoes, and flared tank, for special applications.

For complete information write for Catalog 601.



Types: standard and submerged spiral; flared tank units for extra large pool; simplex and duplex.

Sizes: 12" to 84" spiral diameter.

Capacities: sand raking: up to 7860 tons for 24 hours; overflow: up to 2386 tons per 24 hours

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Complete appraisal of coal-mining operations with special recommendations for reduction of production cost and increase of coal sales. Negotiations for purchase, lease or sale of mining properties.
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Exploration of Coal Properties. Guarantee satisfactory coal cores. Inside Mine Drilling. Pregrouting. Mine Shafts, Large diameter holes.
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Mine Operation—Preparation
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PAUL WEIR COMPANY
Established 1936
Mining Engineers & Geologists
DESIGN AND CONSTRUCTION
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Consulting Mining Engineers
Modern Mines Systems and Designs
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THE CONSULTING ENGINEER

"By reason of special training, wide experience and tested ability, coupled with professional integrity, the consulting engineer brings to his client detached engineering and economic advice that rises above local limitations and encompasses the availability of all modern developments in the fields where he practices as an expert. His services, which do not replace but supplement and broaden those of regularly employed personnel, are justified on the ground that he saves his client more than he costs him."

For the solution of your problems, consult the Professional Services Section of Coal Age.

MOUNTAIN STATE EQUIPMENT COMPANY

HAS PURCHASED THE ST. ELLEN MINE OF PEABODY COAL COMPANY, O'FALLON, ILLINOIS, LOCATED ON U. S. ROUTE 50, APPROXIMATELY FIFTEEN MILES EAST OF ST. LOUIS, MISSOURI. THE ENTIRE STOCK OF EQUIPMENT AND APPROXIMATELY 400 ACRES OF LAND ARE BEING OFFERED FOR SALE AT BARGAIN PRICES.

J. J. MAHONEY AND ROY FAIRCHILD CAN BE CONTACTED AT MINE SITE AT ALL TIMES.

P. O. Box 150
O'Fallon
Illinois

Phone: MErcury 2-3621
MErcury 2-3622
MErcury 2-3623
Night Phone: MErcury 2-5881
EX 7-2033
Belleville, Ill.

THE FOLLOWING IS A PARTIAL LISTING OF EQUIPMENT FOR SALE AT THE MINE SITE

SHUTTLE CARS, 250 VOLTS DC

11—Joy 10SC Shuttle Cars, right and left hand drive.
3—Joy 42-D Battery Shuttle Cars complete with batteries and chargers.
2—60E-10 Joy Shuttle Cars, 250 Volts DC, Disc Brakes, Elevating Discharge, completely modern, in excellent condition. Matched Pair.
2—10SC-1F Joy Shuttle Cars, 500 Volt DC, completely modern, excellent condition.

CUTTING MACHINES, 250 VOLTS DC

4—10RU Joy Cutting Machines
5—324 AA Goodman Slabbers—Track Gauge 42"

TROLLEY LOCOMOTIVES, 42" TRACK GAUGE FOR 250 VOLTS DC

1—13 ton Goodman — Type 81A04T, completely modern
1—Goodman 13 ton 136B-0-4-6 with 2—75 H.P. Motors
2—13 ton Jeffrey Locomotives, (1—inside frame and 1—outside frame)
1—Goodman 5 ton 3013 with 1—50 H.P. Motor.
4—8 ton 132AK42-48R Goodman with 2—50 H.P. Motors with reels.
1—8 ton 32-0-4-T Goodman with 2—50 H.P. Motors with reels.
1—8 ton LM2-8-DD General Electric with 2—50 H.P. Motors with reel.
3—6 ton LM2-T-6MM General Electric with 2—35 H.P. Motors with reel.
2—6 ton LM2-4-6-11 General Electric with 2—35 H.P. Motors with reel.

BATTERY LOCOMOTIVES, 42" TRACK GAUGE

3—Greensburg Monitors complete with charging equipment and batteries.

LOADING MACHINES, 250 VOLTS DC

7—11BU Joy Loading Machines, completely modern with separate pump motors.
6—360 Goodman Loading Machines.
2—14BU-7BG Joy Loading Machines, 220 Volts AC, Excellent condition.
1—14BU-7CE Joy Loading Machine, 250 Volts DC, Excellent Condition.

MOTOR GENERATOR SETS

2—General Electric 300 KW Motor Generator Set, 1200 RPM, primary voltage 2300/4160, 275 Volts DC Complete with panel boards.
1—General Electric 200 KW Motor Generator Sets, 1200 RPM, 2300/4160 primary voltage, 275 pimary voltage 2300/4160, 1200 RPM, 275 Volts DC Complete with panel boards.
2—Westinghouse 200 KW Motor Generator Sets, 1200 RPM, 2300/4160 primary voltage, 275 Volts DC, complete with panel boards.
2—Westinghouse 150 KW Motor Generator Sets, 1200 RPM, 2300/4160 primary voltage, 275 Volts DC, complete with panel boards.

ELEVATING CONVEYORS

3—PL11-16RPE Joy Elevating Conveyors—Straight dump.
3—PL11-16RPE Joy Elevating Conveyors—Converted to side dump.

BELT CONVEYORS

1—Barber Green 36" Lattice Frame Conveyor complete with belt and 15 h.p. 220/440 volt AC drive. Excellent.
1—Barber Green 36" Stacker Conveyor complete with belt, 25 h.p. 220/440 volt drive, 60 ft. long; including "A" Frame and electronic hoist.
2000—ft. Ajax Raynile #130, 42" wide conveyor belt, 1/4" top cover 1/16" bottom cover, 6 ply, with nylon breaker. Excellent condition.
3000—36" Conveyor Belt, 5 ply, 36 oz. Good Condition.

MINE CARS

57—American Car & Foundry 3 door drop bottom mine cars, 18'3¼" overall length, 6' 10" wide, 34" overall height without 10" factory sideboard. 42" track gauge.

WIRE CABLE MATERIAL

35,000 ft.—6/0 fig. 8 Trolley Wire.
3000 ft.—4/0 three conductor 5000 Volt rubber covered cable with 3 ground wires and copper sheath over each conductor.
495 ft.—1/0 three conductor 5000 Volt rubber covered cable w/ground.
7000 ft.—2/0 three conductor 2300 Volt rubber covered bore hole cable.
3000 ft.—4/0 three conductor 5000 Volt trench cable.
4000 ft.—2/0 three conductor 5000 Volt trench cable.
350 ft.—2,000,000 CM Rubber covered Feeder Cable. (New)

TRACK MATERIAL

300—Tons 60 lb. Relaying Rail. Excellent condition.
150—Tons 70 lb. Relaying Rail. Excellent condition.
100—Tons 90 lb. Relaying Rail. Excellent condition.
1000—40 lb. Steel Ties, 42" Track Gauge.
50—40 lb. Switches complete
50—60 lb. Switches complete
1—American Mine Door Automatic Electric Switch Throw complete. All types miscellaneous track material.

COMPLETE FOUR-TRACK TIPPLE CAPABLE OF HANDLING 10,000 TONS OF COAL PER DAY

Partial List of Major Items of Tipple:
Sizes of coal: from ¼ x 0 to 7 x 4" Block
CMI 48" Dryer—complete with motors, drives, belt, etc. screen cloth 1/16" opening, capacity 90 ton per hour.
1—Coppus Ventair Blower #24708.
5—8x6 Allis-Chalmers Centrifugal Pumps, complete with motors (4) breakers.
1—16x14 Allis-Chalmers Centrifugal Pump, complete with motor, starter, breakers.
1—Roberts & Schafer Eleptic Vibrator.
Consists of Belt & Chain Conveyors complete with motors, drives. 36" Belt also some 24x30" Belt.
1—Roberts & Schafer Air Dying Plant (specifications furnished on request)

TRACK CLEANERS

1—Canton Track Cleaner, 42" gauge. Excellent condition.

WELDERS

2—Lincoln 300 amp. MG type, DC.
2—Hobart 300 Amp. MG type, DC.
4—Guyan Resistance Bonders

AIR SHOOTING EQUIPMENT

5—Armstrong Coal Breakers, Model EB-301, equipped with 60 h.p. motors, either 220/440 volt AC or 250 volt DC, complete with auxiliary equipment and controls. Excellent condition.

PORTAFEEDER

1—Nolan Portafeeder complete. Excellent condition.

COAL DRILLS

5—Manson Trucks—10 H.P., DC Tram Motors on 4, 7½ H.P. DC Tram Motors on 1, Joy 9 J Motor with Reduction on 1. Each drill truck has 2 drill arms with 2 Chicago Pneumatic 580 Drills 7½ H.P., DC.
3—Manson Track Trucks, each truck with 2 drill arms & 2.580 Drills.
2—Manson Track Trucks, without drills.
9—Dooley Rubber Tired Drill Trucks, equipped with two arms and two 580 drill motors.
9—Chicago Pneumatic #572, 220 Volt AC Coal Drills.

ROOF DRILLS

1—Joy RBD-7 with 15 HP Reliance Permissible DC and mounted on Manson with 7½ H.P. Westinghouse on Rubber.
1—Jeffrey 56 R.D. with 15 H.P. Motor DC, arm is mounted on Manson Track Truck.
1—Dooley (Rubber Tired) Drill Truck, equipped with Vertical Drilling 580 Drill Motors.
1—Fletcher Roof Bolter complete with Dust Collector. Permissible, 250 Volts DC, like new.

ROCK DUSTERS

1—American Mine Door Road Cleaner
2—MSA Rock Dusters, 25 H.P. Track Permissible

TRUCKS

4—(Shop Built) Mobile Repair Trucks
3—Personnel Jeeps, 42" Track Gauge.

FANS

1—Jeffrey Aerodyne Fan, Serial No. 8687 complete with G. E. 100 H.P. 440 Volt AC Motor and Auxiliary Ford Industrial Power Unit gasoline driven.
1—4 ft. Jeffrey Aerodyne Fan complete with 60 H.P. 220/440 Volt AC Motor and Auxiliary Ford Industrial Power Unit gasoline driven, complete with all necessary equipment and controls.

TRANSFORMERS

3—2400/4160 Y, 240-480 Volts, 100 KVA General Electric Single Phase Transformers.
3—2400/4160 Y, 240-480 Volts, 333 KVA General Electric Single Phase Transformers.
3—2300/4160 Y, 230-115 Volts, 200 KVA General Electric Single Phase Transformers.
3—2300/115/230 Volt, 15 KVA General Electric Single Phase Transformers.
3—50 KVA, 2300/4160 Y, 240/480 Volt General Electric Single Phase Transformers.

CRUSHERS

1—McNally Pittsburg 24 x 36 Stoker Crusher complete with extra set new segments and 40 h.p. 220/440 volt drive.
1—American Pulverizer 36 x 42, 200 tph, #AC-3B.
1—American Pulverizer 24 x 24, 30 tph #WC-24, Heavy Duty.
1—American Pulverizer 36 x 30, 160 tph, #AC-3, screen plate type.
1—American Pulverizer 24 x 30, 75 tph, #WC-30, Drop cage type.
1—American Pulverizer 36 x 30, 100 tph, #AC-30-S, Special heavy duty type.

SUPPLY HOUSE

Complete inventory of new parts for 10SC, 10RU and 11BU Joy Equipment plus cable, tools, hardware, etc. for operation of mine.

BATHHOUSE EQUIPMENT

150—Baskets with Chains, 20 shower heads and complete equipment for operation of bathhouse.

MOBILE EQUIPMENT

1—Koehring Heavy Duty Crane—C5521.
1—Shovel Dipper Stock for same—Size 301, Serial No. 61, Length 16 feet—¾ yard dipper
1—International 1950 Flat Bed Truck Tandem with steel bed and winch, Ser. #3438, 3 axles, weight 18,500 lbs.
1—Haugh Pay Loader, Model HF and HFH, Serial No. 81221
1—Allis Chalmers Tractor Hi Lift, Model HD5, Model #24-27482, Serial No. 22246.
1—Caterpillar Tractor D6, 60" Gauge, Serial No. 5R4778.
1—Whiting Track Mobile, Serial #TM-209.

COMPLETE SHOP AND OFFICE EQUIPMENT STATIONARY MOTORS

AC and DC Motors ranging from 1 to 300 H.P.

MISCELLANEOUS

1—Iron Fireman, 401 Series, Pneumatic Industrial type Spreader Stoker complete with controls.
1—75 Ton Fairbanks Morse Truck Scale.
1—5" Pomona Deepwell Pump, complete with 25 h.p. 220/440 volt AC motor and 31—10 ft. Joints 5" Pipe.

MOUNTAIN STATE EQUIPMENT COMPANY

Box 1050, Beckley, West Virginia **Phone CLifford 3-7383**

J. J. MAHONEY
Res. Phone CLifford 3-6804, Beckley

WILLIAM R. MONK
Res. Phone CLifford 3-6907, Beckley

R. E. KAMM
Res. Phone 4281, Summersville

ELECTRIC AND MACHINE SUPPLY COMPANY

Largest Supplier of the Best Rebuilt Mining Equipment

LOADING MACHINES

3—11BU Joy Loaders, 250 V. D.C.
5—8BU Joy Loaders, A.C. & D.C., rebuilt
1—14BU-7RAE Joy Loaders, 250 V. D.C.
2—14BU-7RBE Joy Loaders, 250 V. D.C.
3—14BU-7BE Joy Loaders, 250 V. D.C.
4—14BU-3PE Joy Loaders, 250 V. D.C.
8—14BU-2E Joy Loaders, 250 V. D.C., 28″ O.H.
3—12BU-9E Joy Loaders, 250 V. D.C., rebuilt
4—20BU Joy Loaders, 250 V. D.C., Permissible
1—360 Goodman Loaders, on rubber, 250 V. D.C.
6—Long 88 Pig Loaders, 250 V. D.C.
1—24BB Clarkson Loader, 250 V. D.C.
1—Eimco 21 Rock Loader

SHUTTLE CARS

5—60E-10 Joy Shuttle Cars, w/Elevators, matched pairs, 250 V. D.C.
9—42E Joy Shuttle Cars, 250 V. D.C.
5—5SC Joy Shuttle Cars, w/Elevators, 250 V. D.C.
17—6SC Joy Shuttle Cars, matched pairs, 250 V. D.C.
2—8SC Joy Shuttle Cars, Elevating Discharge, Permissible Plates, Excellent condition, 250 V. D.C.
17—32E-10 & 32E-16 Joy Shuttle Cars, Excellent condition, 250 V. D.C.
3—32D Joy Shuttle Cars, complete w/ batteries
2—MT66-A45 Jeffrey Shuttle Cars, 250 V. D.C., matched pair, permissible, Excellent condition

CONTINUOUS MINERS

1—3 JCM Joy Continuous Miner, 250 V. D.C., Excellent condition

CUTTING MACHINES

4—12RB Joy Cutting Machines, 250 V. D.C., Permissible, Dual Wheels, Bugdusters, 9′ Bar, Excellent condition.
5—11RU Joy Cutting Machines, 250 V. D.C., Permissible, Bugdusters, one completely rebuilt
1—70-URB Jeffrey Cutting Machines, 250 V. D.C., Excellent condition
1—29U Jeffrey Cutting Machine, 220/440 V. A.C., completely rebuilt, 36″ t.g.
13—512 Goodman Cutting Machines, 250 V. D.C., Hydraulically or Manually Controlled
1—824 Goodman Slabber, 250 V. D.C.
47—35B and 35BB Jeffrey Cutting Machines, A.C. and D.C.
5—7AU Sullivan Cutting Machines, 250 V. D.C.
6—7B Sullivan Cutting Machines, 250 V. D.C.
16—11B Sullivan Cutting Machines, 35 & 50 h.p., 250 V. D.C.
16—12AB, 12AA and 112AA Goodman Cutting Machines, 250 V. D.C.
5—212AA Baby Goodman Cutting Machines, 250 V. D.C.

BELT CONVEYORS

1—36″ Joy Model "C" Belt Conveyor, 1,080′ centers
6—MTB 30 Joy Tandem Belt Conveyors, 1,000′ centers, 25, 40 and 50 h.p., one with Scandura Flame Proof Belting
1—30″ 97HC Goodman Belt Conveyor, 1,000′ centers with 25 h.p. Tandem Drive
4,280′—30″ 99-5GT Goodman Belt Conveyor structure
5—99-5GT Tandem Belt Conveyor Drives
1—30″ Shop Constructed Belt Conveyor Drive
8,760′—26″ Joy Model "C" Structure
18—26″ Belt Conveyor Drives, various makes
1—26″ MTB Joy Tandem Belt Conveyor, 1,000′ centers

MISCELLANEOUS TRACKLESS EQUIPMENT

1—WK-83R Joy Compressor, 250 cu. ft.
1—WL-82 Joy Compressor, 125 cu. ft.
2—T2-5AE & T2-2E Joy Machine Trucks
2—T14G Joy Machine Trucks, 220 V. A.C.
1—Lot 9J, 10J, 23J and 24J Motors

PREPARATION EQUIPMENT

1—4 Cell Jeffrey Baum Jig Washer, complete, 300 t.p.h. capacity
1—Simon Carver Heavy Duty 2 compartment Baum Jig, 400 t.p.h. capacity
1—Daniels Heavy Media Washer
1—48″ CMI Centrifugal Dryer
1—Heat Dryer, complete
1—36″x130′ Hot Material Handling Belt, Excellent
4—7′ x 15′ Single Deck Diester Tables
1—36″ x 33″ Marion Double Roll Crusher
1—30″ x 36″ Jeffrey Double Roll Crusher, Like New
1—30″ x 30″ Link Belt Double Roll Crusher
1—24″ x 50″ Pa. Single Roll Crusher
3—24″ x 24″ Jeffrey Single Roll Crushers
1—2′ x 4′ Williams Pulverizer
1—18″ x 24″ McClanahan & Stone Single Roll Crusher
1—6′ x 16′ Allis Chalmers Double Deck Low Head Vibrator
1—6′ x 14′ Single Deck Allis Chalmers Low Head Vibrator, Like New
1—5′ x 16′ Single Deck Allis Chalmers Low Head Vibrator, Like New
1—5′ x 12′ Allis Chalmers Triple Deck Low Head Vibrator
1—5′ x 12′ Allis Chalmers Ripl-Flo Double Deck Vibrator
1—5′ x 10′ Double Deck Robbins-Gyro Vibrator, Like New
1—4′ x 12′ Hewitt Robbins Vibrex Screen, Triple Deck
5—4′ x 7′ Jeffrey Traylor Double Deck Vibrators
2—4′ x 7′ Jeffrey Traylor Single Deck Vibrators
1—3′ x 4′ Single Deck Gyro Vibrator
2—3′ x 8′ Low Head Vibrators
1—30″ x 72″ Jeffrey Traylor Double Deck Vibrator
9—24″ x 90″ Jeffrey Traylor Vibrators, w/M.G. Sets
2—Magnetic Separators, complete
1—Set Jeffrey Dewatering Screens
4—Scraper Conveyors of various sizes
15—Drag Conveyors of various sizes
1—970′ Jeffrey Rope & Button Conveyor
11—Boom Hoists from 1 ton to 5 ton
We can construct loading booms and tipple belt in any size.

CHAIN AND SHAKER CONVEYORS

20″ Joy Chain Conveyors, A.C. & D.C., Permissible
15″ Chain Conveyor Drives, A.C. & D.C., Permissible
15″ Long Chain Conveyors, A.C. & D.C.
12″ & 15″ Jeffrey Chain Conveyors
12″ Goodman Chain Conveyors
PT12 Long Piggyback Conveyors
PT12-B Long Piggyback Conveyors
Goodman G12½, G15 & G20 Shaker Conveyor Drives
Joy Ladel UN17 Shaker Conveyor Drives
Goodman Power Duckbills & Duckbill Hoists

LOCOMOTIVES, 250 V. D.C.

3—20 Ton Jeffrey MH77 Locomotives, 42″ & 48″ t.g.
1—15 Ton HM828 G.E. Locomotive, 90 h.p. units, 44″ O.H., 48″ t.g., Excellent
11—13 Ton Locomotives, 250 V., any gauge
1—12 Ton 29B Goodman Locomotive, 40″ O.H.
10—10 Ton Locomotives, 250 V., any gauge
20—8 Ton Locomotives, 250 V., any gauge
29—6 Ton Locomotives, any gauge
4—6 Ton Jeffrey MH150 Locomotives
12—6 Ton MH88 Jeffrey Locomotives
11—5 Ton Locomotives, 250 V.
17—4 Ton Locomotives, 250 V., any gauge

BATTERY LOCOMOTIVES

5—7 Ton Atlas Locomotives
2—6 Ton Mancha Locomotives, 36″ t.g., 47″ O.H.
1—4 Ton G.E., 48″ t.g.
1—4 Ton Mancha Locomotive, 48″ t.g.
1—4 Ton Ironton Locomotive, complete w/charger, 44″ t.g.

SUB STATIONS & TRANSFORMERS

1—Westinghouse A.C. Sub Station, 4500 KVA, 6900/2300, complete w/boards, Excellent
4—300KW M. G. Sets
5—200KW M. G. Sets
3—200KW, HCC-6-1200 G. E. Rotary Converters, Automatic
2—150KW G. E. Rotary Converters, w/Transformers
1—150KW Westinghouse Rotary Converter, Completely Automatic
19—150KW M. G. Sets of various makes & voltages
2—100KW M. G. Sets
1—100KW Westinghouse Generator, 250 V. D.C., connected to Buda Diesel Engine, complete w/boards
2—100KW Generators, w/671 G. M. Diesel
1—90KW Generator, w/671 G. M. Diesel, Excellent
1—75KW Generator, w/10019 Diesel Engine
1—75KW Generator, w/75 h.p. G. M. Diesel w/ITE Automatic Control Board
1—100KVA Gasoline Alternator Unit
1—50KW M. G. Set, 125 V. D.C., 1200 rpm
2—Armatures for 200KW Rotary G.E., type HCC
2—600 & 800 Auto Transformers
176—Transformers from 1½KVA to 800KVA, list sent upon request

MINE CARS

50—36″ t.g. Phillips Clay Cars, 50″ O.H., Excellent
40—36″ t.g. Drop Bottom Cars
128—42″ t.g. End Dump Cars, various makes
277—42″ t.g. S. D. Drop Bottom Mine Cars
50—42″ t.g. A.C.F. Drop Bottom Cars
140—44″ t.g. Drop Bottom Cars, various sizes
356—44″ t.g. End Dump Cars, various sizes
82—48″ t.g. S. D. Drop Bottom Cars
259—48″ t.g. A.C.F. Drop Bottom Cars
6—48″ t.g. Man Trip Cars
2—56½″ t.g., 3 ton, 4 wheel push trucks (New)

RAIL AND WIRE

1,285—Tons 30, 40, 56, 60, 70, & 100 lb. Relaying Rail
1,000′—500,000 CM Bare Copper Feeder Cable
15,000′—2/0, 3 cond. Copper Cable, Insulated
37,600′—1/0 Solid Copper Highline Wire
15,000′—#1 Solid Copper Highline Wire
2,643′—#2 Stranded Copper Highline Wire
160,400′—#2 Solid Copper Highline Wire
1,595′—#4 Solid Copper Highline Wire
3,773′—#6 Solid Copper Highline Wire
10,130′—4/0, 3 cond. rubber covered cable, 5,000 V., Excellent condition
5,000′—2/0, 3 cond. Anhydrex & Lead covered Transmission Cable
8,000′—2/0 Single Cond. Insulated Copper
7,500′—2/0 Insulated Cable, 600 V.
1,500′—600 V. Bronco 60 Neoprene certified type W, 2 cond. #6 Copper Wire P1162M, Like New
Several thousand feet #2, #3 and #4 approved type machine cable, 3 & 4 conductor.

MISCELLANEOUS

1—Canton Track Cleaner, Excellent
16—HKL, HKG, HKC, HL & CR Brown Fayro & Sullivan Hoists
49—Air Compressors of various sizes
57—Auto Starters from 3 h.p. to 100 h.p.
70—Hoists from 1½ to 800 h.p.
6—Shop constructed Jeeps, track mounted
7—Hydraulic Schroeder Coal Drills
93—Coal Drills, various makes and sizes
96—Pumps from 3/4″ to 4500 GPM
1—Pomona Deep Well Pump
1—14″ Centrifugal Slurry Pump
33—Battery Chargers, various voltages
17,270′—Pipe: Galvanized, Plastic & Cast Iron
49—Room Blowers—Brown Fayro & Jeffrey
23—Mine fans from 30″ to 9′ HI Pressure
15—Rock Dusters up to 30 h.p.
3—Phillips Machine & Shuttle Car Carriers, 36″ to 48″ t.g.
1—42 Ton Richards Truck Scale, 10′ x 25′ deck
569—Stationary Motors—½ to 800 h.p., A.C. and D.C. (List of motors available upon request)
11,200′—3″ Plastic Pipe
800′—4″ Plastic Pipe

ALL INQUIRIES WILL BE ANSWERED PROMPTLY

WHITESBURG, KENTUCKY
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HANK UBBING
GORDON STAFFORD

WE WILL BE AT THE COAL SHOW THIS YEAR, BOOTH #2513, PLEASE STOP BY AND SEE US.

Quality Mining Machinery For Sale

CALL US FOR YOUR MINING NEEDS, WHETHER BUYING, SELLING, OR TRADING, YOUR CONFIDENCE KEEPS US IN BUSINESS. IF WE ADVERTISE IT—WE OWN IT.

A. C. MINING EQUIPMENT FOR SALE

1—12G-3 Goodman Cutting Machine, A.C.
2—11BU-10APH Joy Loading Machines, 220/440 Volts A.C.
2—4JCM Joy Continuous Miners, 440 Volts A.C.
3—7B Sullivan Cutting Machines, 220/440 Volts A.C.
1—35L Jeffrey Cutting Machine, 220 Volts A.C.
2—14BU Joy Loading Machines, 220/440 Volts AC.
1—35BB Jeffrey Cutting Machine, 220/440 Volts AC.

LOADING MACHINES FOR SALE

1—14 BU-7RAE Joy Loading Machine, 250 Volts D.C.
1—18 HR Joy Loading Machine, 250 Volts D.C.
4—11 BU-10APE Joy Loading Machines, 250 Volts D.C.
1—14 BU-7BE Joy Loading Machine, 250 Volts D.C.
1—14 BU-3PE Joy Loading Machine, 250 Volts D.C.
6—12 BU-9E Joy Loading Machines, 250 Volts D.C.
4—8 BU Joy Loading Machines, 250 Volts D.C.
3—7 BU Joy Loading Machines, 250 Volts D.C.
2—Long 12″ Piggyback Conveyors, each 300′ long, complete with PT-12 Piggybacks and 12BU Joy Loading Machines.
2—14BU-7RBE Joy Loading Machines, 250 Volts, DC, excellent condition.

SHUTTLE CARS FOR SALE

3—10SC Joy Shuttle Cars, 500 Volts DC.
1—5SC Joy Shuttle Car, 250 Volts D.C.
2—6SC-7E Joy Shuttle Cars, Elevating Discharge, 4-Wheel Steering, 250 Volts D.C.
2—42E18 Joy Shuttle Cars, Disc Brakes, Elevating Discharge, Completely Modern, 250 Volts, D.C. 1-Standard, 1-Opposite Standard Drive.
2—60-E Joy Shuttle Cars, 250 Volts D.C.
1—10SC-2PBXE Joy Shuttle Car, Permissible, equipped with 40J, 15 HP Motors.
4—10SC Joy Shuttle Cars, 250 Volts DC.

CUTTING MACHINES FOR SALE

1—512 EJH Goodman Cutting Machine, 250 Volts D.C.
2—29LC Jeffrey Cutting Machines, 250 Volts D.C.
2—10RU Joy Cutting Machines, 250 Volts D.C. with bugduster.
2—29UC Jeffrey Universal Cutters, Permissible, 250 Volts D.C.
1—512 CCH Goodman Cutting Machine, 250 Volts D.C.
4—35B Jeffrey Cutting Machines, 250 Volts D.C.
6—35BB Jeffrey Cutting Machines, 250 Volts D.C.
2—7AU Sullivan Cutting Machines, 250 Volts D.C.
5—35L Jeffrey Machine.
1—11RU Joy Cutting Machine, 250 Volts D.C.

CONTINUOUS MINERS FOR SALE

2—1CM Joy Continuous Miners, 250 Volts D.C.
3—4JCM Continuous Miners, 440 Volts A.C.
1—5 JCM Joy Continuous Miner with self-tramming and extensive belt, 440 Volt AC, complete with 1000 feet of structure and belting with bridge conveyor between miner and belt.

RECTIFIERS FOR SALE

1—400 KW American Selenium Rectifier, 4160 Volts Primary, 275 Volts D.C.

ROTARY CONVERTERS FOR SALE

1—300 KW Westinghouse, Pedestal Type Converter, 275 Volts D.C., Primary 2300/4000.
1—100 KW General Electric HCC-6 Rotary Converter, 1200 RPM, 2300/4000 Volts Primary, 275 Volts D.C., Pedestal Type.
1—200 KW General Electric HCC-6 Rotary Converter, 1200 RPM, 2300/4000 Volts Primary, 275 Volts D.C., Pedestal Type.

COAL DRILLS FOR SALE

1—Chicago Pneumatic RBD-30 Roof Drill.
25—CP-472 Electric Coal Drills, 250 Volts D.C.
5—CP-572 Coal Drills.
10—Chicago Pneumatic Little Giant 572 Coal Drills, 3 phase, 220 Volt A.C., permissible, New.

CRUSHERS FOR SALE

1—36″ x 36″ Double Roll Crusher, complete with 100 H. P. Motor.
1—Robins 36″ x 36″ Double Roll Stoker Crusher, specially built with spike teeth equipped with extra set of new segments.
1—Pennsylvania Single Roll Crusher, 24 x 40.

COMPRESSORS FOR SALE

2—Acme Self-propelled Air Compressors, 83R, Model 168. Capacity 176CFM, with 40 H.P. Reliance Compound Motor. Excellent Condition.

LOCOMOTIVES FOR SALE

1—MH-150 Jeffrey Locomotive, 42″ track gauge, 250 Volts D.C., 26½″ high, rebuilt.
1—General Electric 6 Ton Locomotive with Reel, 36″ gauge.
1—1030 Goodman Locomotive, 24″ high, 44″ track gauge.

ROCK DUSTERS FOR SALE

1—MSA Track Mounted Rock Duster, 10 H.P., A.C., or D.C., high pressure, 30″ high, any gauge.
2—MSA Bantam Rock Dusters, Rubber Tired, Portable.
2—MSA Bantam Rock Dusters, Skid Mounted.
1—American Mine Door, Wheel mounted bantam type rock duster, 250 Volts D.C., 22″ high.

HOISTS FOR SALE

1—Brownie Hoist, 5 H.P., A.C.
6—#11½ Vulcan-Denver Material Hoists, Complete with 3 H.P. D.C. Compound Wound 1750 RPM General Electric Motor.
1—Brownie Hoist, Model HKM—Good condition.
1—Sullivan Type CHL, 5 H.P., Car Spotting Hoist.
2—Joy CHD Hoists, 10 H.P.

ELEVATORS FOR SALE

2—Joy PL11-16 Elevating Conveyors.

MACHINE TRUCKS FOR SALE

2—T2-5APE Joy Machine Trucks, 250 Volts, D. C.
1—T2-5APE Joy Machine Truck, AC.

CHAIN CONVEYORS FOR SALE

5—61AM Jeffrey Chain Conveyors, 10 H.P. 300′ long.
3—61HG Jeffrey Chain Conveyors, 5 H.P. 40′ long.
1—Jeffrey 300 ft. 15″ Chain Conveyor.
1—350 ft. LaDel Conveyor Line, complete.
1—300 ft. Joy Pans and Chains, complete.

DIESEL PLANTS FOR SALE

1—100 KW Waukesha Diesel Generator with 220/400 Volts D.C.
1—100 KW Diesel Generator Unit, with G.M. Diesel Engine and 100 KW Generator.
1—D13000 Caterpillar Diesel Generator Unit—with Caterpillar engine and 75 KVA G.E. generator self-regulating, 220 Volt A.C.
1—30″ Joy Self-Tramming Extensible Belt, 1000 ft. long with belt and drive.

MOTOR GENERATORS FOR SALE

1—150 KW General Electric Motor Generator Set, 2300 Primary, 275 Volts D.C.
1—50 KW Westinghouse MG Set, 440 Volt, A.C., 250 Volt D.C.
1—300 KW Westinghouse Motor Generator Set, synchronous motor, 443 KW Output, 435 KVA, 2200 Volts, 1200 RPM. D.C. generator 300 KW, 275 Volts, 1200 RPM. Compound Wound. Complete with D.C. panel and switch gear.
3—50 KW G.E. and Westinghouse Motor Generator Sets, 2300 Volts A.C., 275 Volts D.C. Complete with switching gear.
1—200 KW Ridgeway Motor Generator Set, Complete with switchgear and 1600 amp. I-T-E automatic circuit breaker, 2300 A.C., 275 Volts D.C.

BELT CONVEYORS FOR SALE

1—35″ Joy Self-Tramming Extensible Belt, 1200 ft. long with belt and drive.
1—30″ Joy Self-Tramming Extensible Belt, 1000 ft. long with belt and drive.
1000 ft. — 97-C Goodman 26″ Bell Structure.

ROOF BOLTING MACHINES FOR SALE

3—Fletcher Roof Bolting Machines; with permissible dust collectors.

THE FOLLOWING OFFERED AS A PACKAGE UNIT ONLY

1—5CM Joy Continuous Miner, 440 Volts A.C.
2—16SC Joy Shuttle Cars, matched pair, 440 Volts A.C.
173—AC&F Drop Bottom Mine Cars, 42″ track gauge, 48″ high, 253 cubic feet.

MISCELLANEOUS FOR SALE

1—Compton Model 56 Auger with 300 H.P. Cummins Diesel Engine Drive, 210 feet 38″ diameter auger (6 sections—35 feet each); 1—42″ cutter head, 70 feet, 48″ diameter auger (2 sections—35 feet each); 1—52″ cutter head.
2—75 KVA Underground Transformers, Skid mounted 40″ high.
3—30 KVA Underground Transformers, skid mounted, 40″ high.
2—3 H.P. Gear Motors with 15″ head and tail assemblies.
2—5 H.P. Gear Motors with 15″ head and tail assemblies.
3—75 KVA Transformers, 2300/4000 Wye to 220 Volts.
3—35B Jeffrey Armatures, 250 Volts D.C.
4—902, 250 Volts D.C. Westinghouse Motor Units, only.
1—PL 11-14 Joy Elevator.
10—Goodman 512 Cutter Bars and Chains.
1—24″ Fan with drive.
2—7½ H.P. Tricycle Type Rubber Tired Mine Tractors, 7½ H.P. 220 Volt Single Phase Motors or 250 Volt D.C. Motors.
3—24 J Motors, 7½ H.P. 250 Volt D.C.
2—42″ Track Gauge Phillips Carriers.
1—Manson Mine Jeep 40″ Track Gauge equipped with 9J Motor.

ALL EQUIPMENT LISTED AND HUNDREDS OF OTHER ITEMS ARE IN STOCK AND MAY BE INSPECTED AT OUR SHOP AND EQUIPMENT YARD LOCATED AT RALEIGH, WEST VIRGINIA

MOUNTAIN STATE EQUIPMENT COMPANY

Box 1050, Beckley, West Virginia — **Phone CLifford 3-7383**

J. J. MAHONEY
Res. Phone CLifford 3-6804, Beckley

WILLIAM R. MONK
Res. Phone CLifford 3-6907, Beckley

R. E. KAMM
Res. Phone 4281, Summersville

—ADVERTISERS IN THIS ISSUE—

***Indicates more product information may be found in company advertising appearing in COAL AGE 1960 July Mining Guidebook and Buying Directory Issue. Check your Guidebook index.**

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Advertising Sales Manager

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1375 Peachtree St., N.E., Telephone: 875-0523

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McGraw-Hill Bldg., Copley Square, Congress 2-1160

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520 No. Michigan Ave., Mohawk 4-5800

Cleveland 13 ..... W. W. Forysiak
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255 California St., Douglas 2-4600

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34 Dover Street, Telephone: Hyde Park 1451

Frankfurt/Main, Germany ..... S. Kimes
85, Westendstrasse, Telephone: 772665

Geneva, Switzerland ..... M. R. Zeynel
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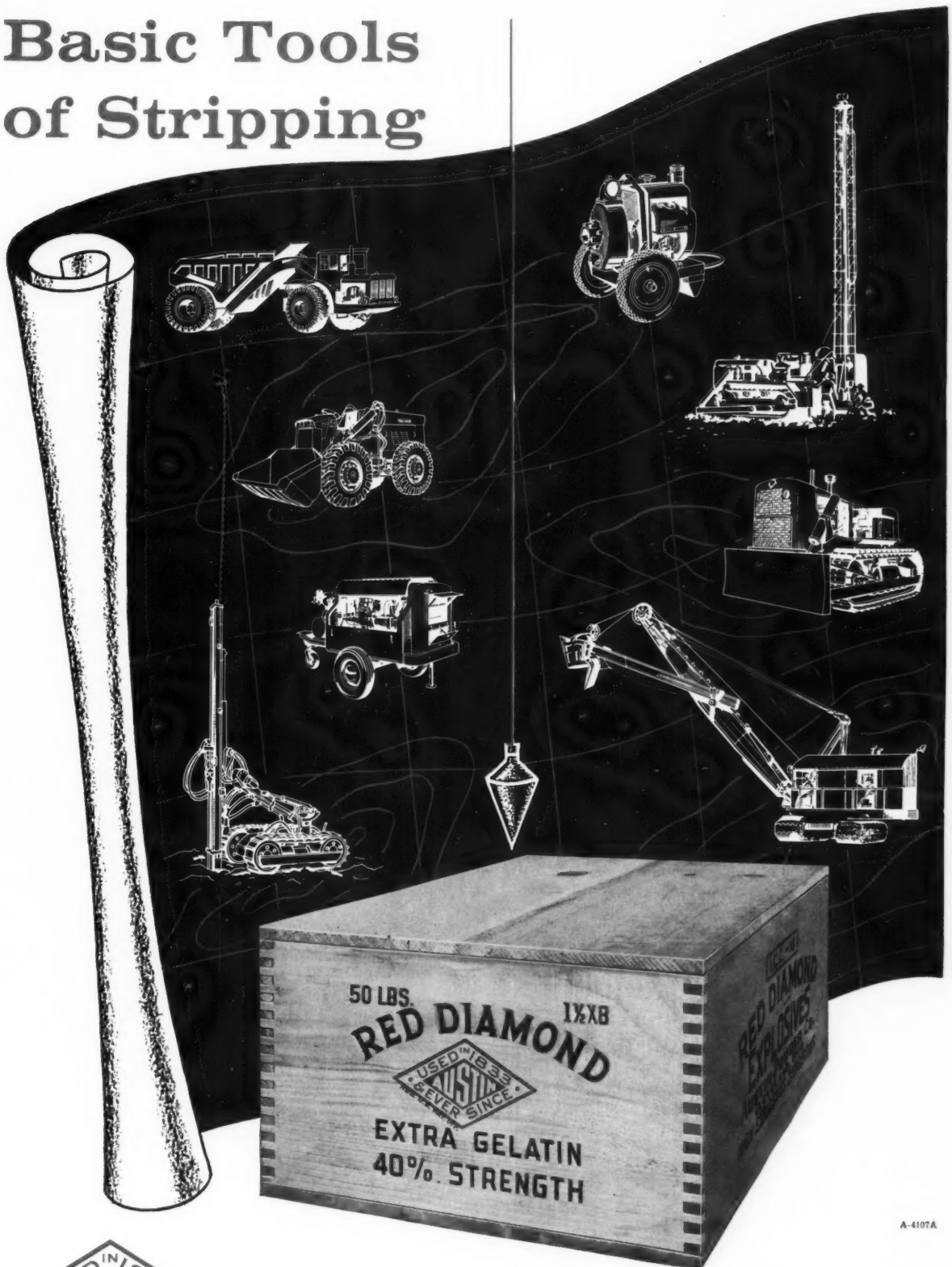
Basic Tools of Stripping



A-4107A

USED IN 1833 AUSTIN & EVER SINCE

AUSTIN POWDER COMPANY

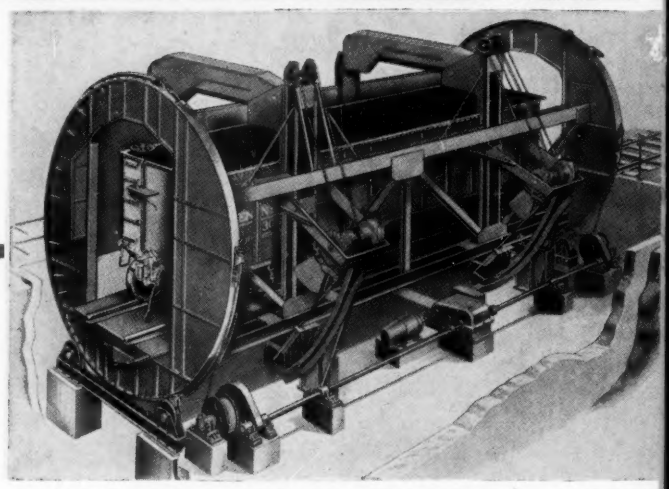
Cleveland 13, Ohio

explosives ◆ ammonium nitrates ◆ primers ◆ blasting supplies
detonating fuse and connectors ◆ AP drill heads

Small or moderate capacities?

Shake 'em empty!

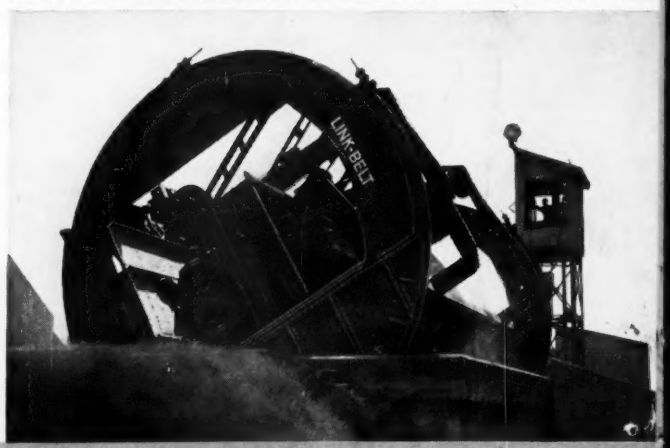
CAR SHAKERS assure rapid, broom-clean unloading of hopper-bottom cars. The Link-Belt car shaker produces a series of solid blows to a long section of the car sides . . . loosening the coal and accelerating its flow. Unloading time for damp, sticky or frozen loads is reduced by car shaker's effective action. Wear to cars is no more than that encountered in normal operation over road bed. And cars need not be uncoupled while the shaker is in operation.



Large capacities?

Roll 'em empty!

ROTARY DUMPERS empty open-top cars of any length, width or height. Full unloading cycle of standard Link-Belt dumpers takes 90 seconds. However, drives can be furnished for cycles as short as 40 seconds. Operation is simple. As rotation begins, transfer table moves sidewise until car rests against timbered side frame of cradle. Simultaneously, overhead clamps secure car to rails. Cradle rotates until automatically stopped at the inverted position. Operation is then reversed.



Coal cars empty cleaner, faster, easier with LINK-BELT car shakers and rotary dumpers

If you receive coal by rail, you'll find the most economical way to unload it is by pushbutton . . . with Link-Belt equipment. A Link-Belt rotary dumper unloads 20 or more cars per hour including normal spotting and handling time. For lower-volume jobs, a Link-Belt car shaker is your best choice. Both are ruggedly built for long, reliable service. Both minimize time and manpower requirements . . . cut costly demurrage charges . . . reduce operational hazards. For complete information, contact your nearest Link-Belt office.

LINK-BELT

CAR SHAKERS AND ROTARY DUMPERS

LINK-BELT COMPANY: Chicago 9, Birmingham 9, Cleveland 20, Denver 2, Detroit 4, Huntington 9, W. Va., Indianapolis 6, Kansas City 8, Mo., Louisville 8, Pittsburgh 13, Seattle 4, St. Louis 1. To Serve Industry There are Link-Belt Plants, Warehouses and District Sales Offices in All Principal Cities, Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs Representatives Throughout the World. 15.409

See our exhibit, 1961 Coal Show, Public Auditorium, Cleveland, May 15-18, Space 107